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"Wie das Gestirn,
Ohne Hast
Aber ohne Rast,
Drehe sich jeder
Um die eigene Last."

GOETHE.

TRANSACTIONS OF THE AMERICAN GYNECOLOGICAL SOCIETY.

VOLUME 15.

FOR THE YEAR 1890.

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The Society does not hold itself responsible for the views enunciated in the papers read at its meetings.

HENRY CLARK COE, M.D., *Secretary*,
27 East Sixty-fourth Street, New York.

30299

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OFFICERS AND FELLOWS

OF THE

AMERICAN GYNECOLOGICAL SOCIETY.

1890.

OFFICERS FOR 1890–1891.

PRESIDENT.

A. REEVES JACKSON, Chicago.

VICE-PRESIDENTS.

JOSEPH TABER JOHNSON, Washington.
WILLIAM H. BAKER, Boston.

SECRETARY.

HENRY CLARK COE, New York.

TREASURER.

MATTHEW D. MANN, Buffalo.

OTHER MEMBERS OF THE COUNCIL.

WILLIAM M. POLK, New York.
H. P. C. WILSON, Baltimore.
FRANCIS H. DAVENPORT, Boston.
E. C. DUDLEY, Chicago.

HONORARY FELLOWS.

* Deceased.

ELECTED.

1877. *JOHN L. ATLEE, M.D., Lancaster, Pa.
1884. GEORGE GRANVILLE BANTOCK, M.D., London, Eng.
1876. ROBERT BARNES, M.D., London, England.
1878. JOHN S. BILLINGS, M.D., LL.D., U. S. Army, Washington.
1890. HENRY F. CAMPBELL, A.M., M.D., Augusta, Georgia.
1889. M. CHARPENTIER, Paris, France.
1877. *JOHN C. DALTON, New York.
1888. J. AMEDÈE DOLÈRIS, M.D., Paris, France.
1878. *J. MATTHEWS DUNCAN, M.D., London, England.
1888. ALEXANDER DUNLAP, M.D., Springfield, Ohio.
1876. *JOSEPH A. EVE, M.D., Augusta, Georgia.
1889. ROBERT P. HARRIS, M.D., Philadelphia.
1888. GRAILY HEWITT, M.D., London, England.
1881. J. BRAXTON HICKS, M.D., London, England.
1876. THOMAS KEITH, M.D., London, England.
1888. GILMAN KIMBALL, M.D., Lowell, Massachusetts.
1888. AUGUST MARTIN, M.D., Berlin, Germany.
1876. *ALFRED H. M'CLINTOCK, M.D., Dublin, Ireland.
1888. EMIL NOEGGERATH, M.D., Wiesbaden, Germany.
1877. CHARLES PAJOT, M.D., Paris, France.
1885. W. S. PLAYFAIR, M.D., London, England.
1888. WILLIAM O. PRIESTLEY, M.D., London, England.
1876. *KARL SCHROEDER, M.D., Berlin, Germany.
1888. ALEXANDER R. SIMPSON, M.D., Edinburgh, Scotland.
1876. *GUSTAV SIMON, M.D., Heidelberg, Germany.
1888. D. HUMPHREYS STORER, M.D., Boston.
1882. LAWSON TAIT, Esq., Birmingham, England.
1881. S. TARNIER, M.D., Paris, France.
1882. J. KNOWSLEY THORNTON, Esq., London, England.
1888. *ISAAC E. TAYLOR, M.D., New York.
1876. Sir T. SPENCER WELLS, London, England.
1881. F. WINCKEL, M.D., Dresden, Germany.
1876. *MARMADUKE B. WRIGHT, M.D., Cincinnati.

Total, twenty-four Honorary Fellows.

FELLOWS.

1888.—Ashby, Thomas A., M.D. Professor of Diseases of Women in Baltimore Medical College; Professor of Obstetrics and Clinical Gynecology in Woman's Medical College of Baltimore; Consulting Gynecologist to Home for Incurables; Obstetrician and Gynecologist to Good Samaritan Hospital; Gynecologist to Maryland General Hospital; President of Medical and Chirurgical Faculty of Maryland. 1125 Madison Avenue, Baltimore.

Founder.—*Atlee, Washington L., M.D. 1878.

1886.—Baer, B. F., M.D. Ex-President Obstetrical Society of Philadelphia; Professor of Gynecology in the Philadelphia Polyclinic. 2010 Chestnut Street, Philadelphia.

1882.—Baker, William H., M.D. Professor of Gynecology, Harvard University; Surgeon to the Free Hospital for Women. *Council*, 1886, 1890. *Vice-President*, 1891. 22 Mount Vernon Street, Boston.

1889.—Baldy, J. M., M.D., 330 South Seventeenth St., Phila.

Founder.—Barker, Fordyce, M.D., LL.D. (Columbia, University of Edinburgh, University of Glasgow). Clinical Professor of Midwifery and Diseases of Women in Bellevue Hospital Medical College; Honorary Fellow of the Obstetrical Societies of London and Edinburgh, and the New York Obstetrical Society; Honorary Member of the British Gynecological Society; Honorary Fellow of the London Medical Society and Massachusetts Medical Society; Corresponding Fellow of the College of Physicians of Philadelphia; Honorary Member of the Association of American Physicians; Ex-President of the New York Academy of Medicine, etc. *President*, 1876–77. *Council*, 1883. 34 East Thirty-eighth Street, New York.

* Deceased.

Founder.—Battey, Robert, M.D. Formerly Professor of Obstetrics, and Clinical Professor of Gynecological Surgery, Atlanta Medical College. *Vice-President*, 1880. *President*, 1889. 412 First Avenue, Rome, Georgia.

1875.—†Bixby, George H., M.D. 1889.

1888.—Boldt, Hermann J., M.D. Gynecologist to the German Poliklinik; Surgeon to St. Mark's Hospital; Fellow of the British Gynecological Society. 245 West Forty-second Street, New York.

1878.—†Bozeman, Nathan, M.D. 1886.

1881.—Browne, B. Bernard, M.D. Professor of Diseases of Women and Clinical Midwifery in the Woman's Medical College of Baltimore; Gynecologist to the Good Samaritan Hospital. *Council*, 1885, 1889–'90. 1218 Madison Avenue, Baltimore.

Founder.—*Buckingham, Charles E., M.D. 1877.

Founder.—Busey, Samuel C., M.D., LL.D. Ex-President of the Association of American Physicians (1889–'90); Member of the American Pediatric Society; Honorary Member of the Medical Society of the State of New York; Corresponding Member of the Boston Gynecological Society. *Vice-President*, 1883. 1545 I Street, N. W., Washington, D. C.

1889.—Byford, Henry T., M.D. Professor of Clinical Gynecology, Woman's Medical College; Professor of Gynecology to the Chicago Post-Graduate Medical School; Gynecologist to St. Luke's Hospital; Surgeon to the Woman's Hospital of Chicago. 3001 Calumet Avenue, Chicago.

Founder.—*Byford, William H., M.D., LL.D. 1890.

Founder.—Byrne, John, M.D., M.R.C.S.E. Formerly Clinical Professor of Uterine Surgery, Long Island College Hospital; Surgeon-in-Chief to St. Mary's Hospital for Diseases of Women. *Council*, 1879, 1883. 314 Clinton Street, Brooklyn, N. Y.

Founder.—‡Campbell, Henry F., A.M., M.D. Professor of Principles and Practice of Surgery and of Gynecology, University of Georgia; Surgeon to the City Hospital, Augusta. *Vice-President*, 1881. *Council*, 1883. 715 Broad Street, Augusta, Georgia.

Founder.—Chadwick, James R., A.M., M.D. Formerly Clinical Instructor in Gynecology, Harvard University. *Secre-*

† Resigned. ‡ See Honorary Fellows.

tary, 1876–'82. *Vice-President*, 1883, 1888. 270 Clarendon Street, Boston.

1889.—Cleveland, Clement, A.M., M.D. Surgeon to the Woman's Hospital in the State of New York; Gynecologist to the New York Cancer Hospital. 59 West Thirty-eighth Street, New York.

1888.—Coe, Henry C., A.M., M.D., M.R.C.S. Gynecologist to the New York Cancer Hospital; Assistant Surgeon to the Woman's Hospital; Obstetric Surgeon to the Maternity Hospital; Obstetrician to the Infant Asylum; Professor of Gynecology at the New York Polyclinic. *Secretary*, 1891. 27 East Sixty-fourth Street, New York.

1888.—Coleman, John Scott, M.D. Fellow of the American Surgical Association. 563 Green Street, Augusta, Georgia.

1889.—Currier, Andrew F., A.B., M.D. Instructor in Gynecology at the Post-Graduate Medical School; Assistant Surgeon to the Skin and Cancer Hospital; Attending Gynecologist to Bellevue Hospital, Out-patient Department. 159 East Thirty-seventh Street, New York.

1889.—Davenport, Francis H., A.B., M.D. Assistant in Gynecology in Harvard Medical School; Assistant Surgeon to the Free Hospital for Women; Physician to the Department of Diseases of Women in the Boston Dispensary. *Council*, 1891. 5 Park Square, Boston.

Founder.—Drysdale, Thomas M., A.M., M.D. *Council*, 1886. 1531 Arch Street, Philadelphia.

1888.—Dudley, A. Palmer, M.D. Instructor in Gynecology in the New York Post-Graduate Medical School; Gynecologist to Randall's Island Hospital; Gynecologist to Northeastern Dispensary. 640 Madison Avenue, New York.

1886.—Dudley, Emilius Clark, A.B., M.D. Professor of Gynecology in Chicago Medical College; Fellow of the British Gynecological Society. *Council*, 1891. 1619 Indiana Avenue, Chicago, Ill.

1879.—Duer, Edward L., M.D. Lecturer on Diseases of Women and Children at the Philadelphia Hospital; Gynecologist to the Presbyterian Hospital. 1704 Arch Street, Philadelphia.

1877.—†Dunlap, Alexander, A.M., M.D. 1886.

1887.—Emmet, Bache McE., M.D. Professor of Diseases of Women in the New York Post-Graduate Medical School; Surgeon to the Woman's Hospital in the State of New York. 18 East Thirtieth Street, New York.

Founder.—Emmet, Thomas Addis, M.D., LL.D. Surgeon to the Woman's Hospital in the State of New York; Consulting Physician to the Roosevelt Hospital and to the New York Foundling Asylum. *Council*, 1878–'79. *President*, 1882. 93 Madison Avenue, New York.

Founder.—Engelmann, George J., A.M., M.D. Master in Obstetrics, Vienna; Professor of Diseases of Women and Operative Midwifery, Missouri Medical College and Post-Graduate School; Consulting Surgeon to the St. Louis Female Hospital. *Council*, 1879, 1882. *Vice-President*, 1885. 3003 Locust Street, St. Louis.

1890.—Etheridge, James H., A.M., M.D. Professor of Therapeutics and Medical Jurisprudence, Rush Medical College; Gynecologist to the Presbyterian Hospital and Central Free Dispensary; Physician to St. Luke's Hospital; President of the Chicago Medical Society. 1634 Michigan Avenue, Chicago.

1889.—Ford, Willis E., A.M., M.D. 266 Genesee Street, Utica, New York.

1881.—Foster, Frank P., M.D. *Secretary*, 1882–'85. *Council*, 1885, 1888. 16 East Thirty-first Street, New York.

1890.—Fry, Henry D., M.D. 1133 Fourteenth Street, N. W., Washington, D. C.

1877.—Garrigues, Henry J., A.M., M.D. Professor of Obstetrics at the New York Post-Graduate Medical School; Obstetric Surgeon to the New York Maternity Hospital; Consulting Obstetrician to the New York Infant Asylum; Gynecologist to the German Hospital and Dispensary. *Council*, 1882. 155 Lexington Avenue, New York.

1888.—Gehrung, Eugene C., M.D. President of the St. Louis Obstetrical and Gynecological Society; Chief of the Gynecological Department of the South Side Dispensary; Consulting Surgeon to the St. Louis Female Hospital. 2215 Olive Street, St. Louis.

1881.—†Gillette, Walter R., M.D. 1889.

Founder.—Goodell, William, A.M., M.D. Professor of

Gynecology, University of Pennsylvania. *Council*, 1876–'77, 1880. *Vice-President*, 1878. 1418 Spruce Street, Philadelphia.

1877.—Goodman, John, M.D. Professor of Obstetrics, Louisville Medical College. 236 Third Street, Louisville.

1888.—Gordon, S. C., M.D. Portland, Maine.

1890.—Grandin, Egbert H., M.D. Obstetric Surgeon to New York Maternity Hospital; Obstetrician to the New York Infant Asylum. 36 East Fifty-eighth Street, New York.

1886.—Green, Charles M., A.B., M.D. Instructor in Obstetrics, Harvard University; Obstetric Physician to the Boston Dispensary: Assistant Visiting Physician to the Boston Lying-in Hospital; Physician to the Out-patient Department for the Diseases of Women, Boston City Hospital. 78 Marlborough Street, Boston.

1887.—Hanks, Horace Tracy, M.D. Professor of Diseases of Women in the New York Post-Graduate School; Surgeon to the New York Woman's Hospital; Consulting Surgeon to the Northeastern Dispensary; Fellow of the British Gynecological Society; President of the New York Obstetrical Society (1887–'89); Vice-President of the New York Academy of Medicine (1882–'85). 766 Madison Avenue, New York.

Founder.—Howard, William T., M.D. Professor of the Diseases of Women and Children, and of Clinical Medicine, University of Maryland; Gynecologist to the University Hospital; Gynecologist to the Woman's Hospital of the State of Maryland; Consulting Physician to the Hebrew Hospital and Asylum Association of Baltimore, Maryland. *Vice-President*, 1880. *Council*, 1883. *President*, 1884. 804 Madison Avenue, Baltimore.

1885.—*Hunter, James Bradbridge, M.D. 1889.

1875.—†Ingham, James V., M.D. 1889.

1877.—Jackson, A. Reeves, A.M., M.D. Professor of the Diseases of Women and of Clinical Gynecology, College of Physicians and Surgeons of Chicago; formerly Surgeon-in-Chief of the Woman's Hospital of the State of Illinois; Consulting Surgeon to the Dispensary of the Woman's Christian Association; Chief of the Gynecological Department of the West Side Dispensary. *Council*, 1883, 1884, 1886. *Vice-President*, 1888. *President*, 1891. 271 Michigan Avenue, Chicago.

1889.—Jaggard, W. W., M.D. Professor of Obstetrics, Chicago Medical College; Obstetrician to Mercy Hospital; President of the Chicago Gynecological Society. 2330 Indiana Ave., Chicago.

1886.—Janvrin, Joseph E., M.D. President of the New York Obstetrical Society (1889–1891); Gynecologist to the Skin and Cancer Hospital; Consulting Surgeon to St. Elizabeth's Hospital. *Council*, 1889. 191 Madison Avenue, New York.

Founder.—Jenks, Edward W., M.D., LL.D. Formerly Professor of the Medical and Surgical Diseases of Women and of Clinical Gynecology, Chicago Medical College; Gynecologist to the Mercy Hospital. *Council*, 1879. *Vice-President*, 1889. 84 Lafayette Avenue, Detroit.

1885.—Jewett, Charles, A.M., M.D. Professor of Obstetrics and Diseases of Children, Long Island College Hospital, Brooklyn; Attending Physician to Long Island College Hospital; Physician-in-Chief to Department of Children's Diseases, St. Mary's Hospital, Brooklyn; Fellow British Gynecological Society. 307 Gates Avenue, Brooklyn.

Founder.—Johnson, Joseph Taber, A.M., Ph.D., M.D. Professor of Gynecology, University of Georgetown; Gynecologist to the Providence Hospital; Member British Medical Association; President of the Woman's Dispensary; President of the Medical Society of the District of Columbia (1887); Fellow of the British Gynecological Society; President of the Washington Obstetrical and Gynecological Society. *Council*, 1881, 1884. *Secretary*, 1885–'90. *Vice-President*, 1891. 926 Farragut Square, Washington.

1886.—Johnstone, Arthur W., A.M., M.D. Fellow of the British Gynecological Society. Oak Street, Cincinnati, Ohio.

1887.—Kelly, Howard A., M.D. Associate Professor of Gynecology and Obstetrics in Johns Hopkins University; Gynecologist and Obstetrician to the Johns Hopkins Hospital; Consulting Surgeon to the Kensington Hospital for Women, Philadelphia. Johns Hopkins Hospital, Baltimore.

1877.—†Kimball, Gilman, M.D. 1887.

1886.—King, Albert F. A., A.M., M.D. Professor of Obstetrics and Diseases of Women and Children in the Medical Department of the Columbian University, Washington, and in

the University of Vermont; President of the Washington Obstetrical and Gynecological Society (1885–'87); Fellow of the British Gynecological Society; Consulting Physician to the Children's Hospital, Washington; Consulting Physician to the Woman's Dispensary. 726 Thirteenth Street, Washington.

1887.—Kollock, Cornelius, A.M., M.D. Ex-President South Carolina Medical Association; Fellow of the American Academy of Medicine; President of the Pee-Dee Medical Association; Fellow of the Southern Surgical and Gynecological Association; Corresponding Member of the Boston Natural History Society. Cheraw, S. C.

1881.—Lee, Charles Carroll, A.M., M.D., LL.D. Professor of Gynecology in the New York Post-Graduate School; Consulting Surgeon to the Charity Hospital, the New York State Woman's Hospital, and St. Elizabeth's Hospital; Physician to the New York Foundling Asylum. *Council*, 1886. 79 Madison Avenue, New York.

Founder.—Lusk, William T., M.D. Professor of Obstetrics, of the Diseases of Women and Children, and of Clinical Midwifery, Bellevue Hospital Medical College; Physician to Bellevue Hospital; Consulting Surgeon to the Maternity Hospital; Visiting Physician to the Emergency Lying-in Hospital. *Vice-President*, 1889. 47 East Thirty-fourth Street, New York.

Founder.—†Lyman, George H., M.D. 1885.

1882.—Mann, Matthew D., A.M., M.D. Professor of Obstetrics and Gynecology, University of Buffalo; Gynecologist and Consulting Obstetrician to the Buffalo General Hospital. *Treasurer*, 1883–'91. 37 Allen Street, Buffalo, N. Y.

1883.—Maury, R. B., M.D. *Council*, 1885, 1888. 273 Beale Street, Memphis, Tenn.

Founder.—Mundé, Paul F., M.D. Master in Obstetrics, Vienna; Professor of Gynecology, New York Polyclinic, and at Dartmouth College: Gynecologist to Mount Sinai Hospital; Consulting Surgeon to St. Elizabeth's Hospital. *Treasurer*, 1876–'83. *Vice-President*, 1884. 20 West Forty-fifth Street, New York.

1891.—Murray, Robert A., M.D. Obstetric Surgeon to Maternity Hospital. 235 West Twenty-third Street, New York.

Founder.—†Noeggerath, Emil, M.D. 1887.

1880.—Palmer, Chauncey D., M.D. Professor of Obstetrics, of the Medical and Surgical Diseases of Women, and of Clinical Gynecology in the Medical College of Ohio; Professor of Gynecology and of Clinical Gynecology in the Woman's State Hospital and Medical College; Obstetrician and Gynecologist to the Cincinnati Hospital. *Council*, 1888. 308 West Seventh Street, Cincinnati.

1885.—Parish, William H., M.D. Obstetrician to the Philadelphia Hospital; Consulting Obstetrician to the Philadelphia Lying-in Charity; Professor of Anatomy in the Woman's Medical College of Pennsylvania; Professor of Obstetrics, Dartmouth Medical College; Consulting Surgeon, Kensington Hospital; Consulting Gynecologist, St. Agnes's Hospital; Gynecologist to the Philadelphia Polyclinic. 1435 Spruce Street, Philadelphia.

Founder.—Parvin, Theophilus, M.D., LL.D. Professor of Obstetrics and of the Diseases of Women and Children in the Jefferson Medical College. *Council*, 1876–77. *Vice-President*, 1882 and 1886. 1626 Spruce Street, Philadelphia.

Founder.—*Peaslee, E. Randolph, M.D., LL.D. 1878.

Founder.—†Penrose, Richard A. F., A.M., M.D., LL.D. 1885.

1881.—Polk, William M., M.D. Professor of Obstetrics and Diseases of Women and Children, University of the City of New York; Physician to Bellevue Hospital and to the Emergency Lying-in Hospital; Consulting Gynecologist to St. Luke's Hospital. *Vice-President*, 1890. *Council*, 1891. 7 East Thirty-sixth Street, New York.

1877.—Reamy, Thaddeus A., A.M., M.D., LL.D. Professor of Clinical Gynecology in the Medical College of Ohio; Gynecologist and Obstetrician to the Cincinnati Hospital; Gynecologist to the Good Samaritan Hospital; Surgeon to the Woman's Hospital, Cincinnati; Consulting Gynecologist to Christ's Hospital; Consulting Gynecologist to the Ohio State Hospital for Women; Fellow of the Medico-Chirurgical Society of Philadelphia; Corresponding Member of the Boston Gynecological Society. *Vice-President*, 1881. *Council*, 1883. *President*, 1885. Oak Street, Cincinnati, Ohio.

Founder.—Reeve, John C., M.D. President of the Medical

Staff of St. Elizabeth's Hospital; formerly Professor of Materia Medica and Therapeutics, Medical College of Ohio. *Council*, 1881 and 1885. *Vice-President*, 1887. Corner of Third and Wilkinson Streets, Dayton, Ohio.

1891.—Reynolds, Edward, M.D. Physician to the Boston Lying-in Hospital, Out-patient Department; Physician to the Stainford St. Dispensary for Women. 15 Charles Street, Boston.

1877.—Reynolds, John P., M.D. Late Professor of Obstetrics, Harvard University; Consulting Surgeon to the Boston City Hospital. *President*, 1890. 236 Clarendon Street, Boston.

Founder.—Richardson, William L., M.D. Professor of Obstetrics, Harvard University; Physician to the Boston Lying-in Hospital; Visiting Physician to the Massachusetts General Hospital. *Vice-President*, 1884. 225 Commonwealth Avenue Boston.

1881.—Sawyer, Edward Warren, M.D. 3733 Vincennes Avenue, Chicago, Illinois.

1879.—*Scott, John, M.D., M.R.C.S.I. 1886.

1886.—Sims, H. Marion, M.D. Surgeon to St. Elizabeth's Hospital; Gynecologist to the New York Infant Asylum; Profesor of Gynecology at the New York Polyclinic. 4 East Forty-seventh Street, New York.

Founder.—*Sims, J. Marion, M.D., LL.D. 1883.

Founder.—Sinclair, Alexander D., M.D. Consulting Physician to the Boston City Hospital, the Boston Lying-in Hospital, and the Free Hospital for Women. *Council*, 1880. 35 Newberry Street, Boston.

Founder.—Skene, Alexander J. C., M.D. Professor of the Medical and Surgical Diseases of Women, Long Island College Hospital. *Council*, 1878, 1880. *President*, 1886–'87. 167 Clinton Street, Brooklyn.

Founder.—*Smith, Albert H., M.D. 1886.

Founder.—‡Storer, D. Humphreys, M.D., LL.D. *Vice-President*, 1879. 182 Boylston Street, Boston.

1879.—Sutton, R. Stansbury, A.M., M.D., LL.D. Formerly President of the American Academy of Medicine and of the Pittsburg Obstetrical and Gynecological Society; Associate Fellow of the Philadelphia Obstetrical Society; Fellow of the British Gynecological Society; Surgeon to Terrace Bank Hos-

pital for Women. *Council*, 1883. 419 Penn Avenue, Pittsburg, Pa.

Founder.—†Taylor, Isaac E., M.D., LL.D. 1887.

Founder.—Thomas, T. Gaillard, M.D., LL.D. Professor Emeritus of the Diseases of Women and Children, College of Physicians and Surgeons; Consulting Surgeon to the Woman's Hospital in the State of New York; Consulting Physician to the Nursery and Child's Hospital, New York, and to St. Mary's Hospital, Brooklyn. *President*, 1879. *Council*, 1883. 600 Madison Avenue, New York.

Founder.—*Trask, James D., M.D. 1883.

1879.—†Underhill, J. W., M.D. 1886.

Founder.—Van de Warker, Ely, M.D. Surgeon to the Central New York Hospital for Women; Surgeon to the Syracuse Woman's and Children's Hospital. *Council*, 1884–'89. 104 Fayette Park, Syracuse, N. Y.

Founder.—*Wallace, Ellerslie, M.D. 1885.

Founder.—*White, James P., M.D. 1881.

1867.—*Wilson, Ellwood, M.D. 1889.

Founder.—Wilson, Henry P. C., M.D. Ex-President of the Medical and Chirurgical Faculty of Maryland, of the Baltimore Academy of Medicine, and of the Baltimore Obstetrical and Gynecological Society; Surgeon to the Hospital for the Women of Maryland; Consulting Gynecologist to St. Agnes's Hospital, and to the Union Protestant Infirmary; Member of the British Medical Association; Fellow of the British Gynecological Society; Consulting Surgeon to the Johns Hopkins Hospital. *Vice-President*, 1879. *Council*, 1884. *President*, 1889. 814 Park Avenue, Baltimore.

1886.—Wylie, W. Gill, M.D. Professor of Gynecology in the New York Polyclinic; Gynecologist to Bellevue Hospital, New York; Consulting Surgeon to the Methodist Episcopal Hospital, Brooklyn; Fellow of the Academy of Medicine; Fellow of the British Gynecological Society. 40 West Fortieth Street, New York.

Total, 71 Active Fellows.

MINUTES OF THE PROCEEDINGS

AT THE

FIFTEENTH ANNUAL MEETING

OF THE

AMERICAN GYNECOLOGICAL SOCIETY,

HELD IN THE

BUFFALO LIBRARY,

Buffalo,

SEPTEMBER 16, 17, AND 18, 1890.

Gyn Soc c

FIFTEENTH ANNUAL MEETING.

BUFFALO, TUESDAY, WEDNESDAY, AND THURSDAY, *September* 16, 17, *and* 18, 1890.

THE following Fellows were present:

THOMAS A. ASHBY	BALTIMORE.
B. B. BROWNE	BALTIMORE.
HENRY T. BYFORD	CHICAGO.
CLEMENT CLEVELAND	NEW YORK.
FRANCIS H. DAVENPORT	BOSTON.
A. PALMER DUDLEY	NEW YORK.
E. C. DUDLEY	CHICAGO.
WILLIS E. FORD	UTICA.
E. C. GEHRUNG	ST. LOUIS.
CHARLES M. GREEN	BOSTON.
W. W. JAGGARD	CHICAGO.
EDWARD W. JENKS	DETROIT.
JOSEPH TABER JOHNSON	WASHINGTON.
ARTHUR W. JOHNSTONE	CINCINNATI.
HOWARD A. KELLY	BALTIMORE.
MATTHEW D. MANN	BUFFALO.
WILLIAM M. POLK	NEW YORK.
JOHN P. REYNOLDS	BOSTON.
ALEXANDER D. SINCLAIR	BOSTON.
ALEXANDER J. C. SKENE	BROOKLYN.
HENRY P. C. WILSON	BALTIMORE.

Total, twenty-one Fellows.

FIRST DAY.—*Tuesday, September 16, 1890.*

Morning Session.—The meeting was called to order by the President, Dr. John P. Reynolds, of Boston.

Twenty-one Fellows responded to the roll-call.

The President introduced Dr. Roswell Park, of Buffalo, who delivered the following address of welcome:

GENTLEMEN OF THE GYNECOLOGICAL SOCIETY: The peculiar pleasure which I experience in welcoming you to our city is shared, I am sure, by every one of my local professional

brethren. Aside from the esteem in which we hold each of you personally, knowing each of you as we do, at least by reputation, and because of the noble work in which you are engaged, as well as for the energetic manner in which you perform it, we have for you possibly a warmer greeting because a number of years have passed since we have had here a representative national gathering of medical men. A dozen years or so ago the American Medical Association convened here, and as a visitor at that time I can look back upon the occasion with most pleasant recollections. Since then Buffalo physicians have enjoyed the hospitalities of many other cities, American and foreign, but I do not recall that we have again had an opportunity to take unto our hearts and into our homes such an eminently talented and widely-known company of literary or scientific men as that to which I now have the honor of offering the hospitalities and courtesies of their colleagues.

Yours is a noble branch of the healing art and humanity—or femininity—is vastly indebted to members of your society. That the women of Western New York appreciate the fact and are grateful accordingly would be proved by hundreds of them could they here express themselves. The gynecology of this region has been based mainly upon the teachings of two of your members, the one dead, the other living, and the hundreds of students who have gone forth from the Buffalo Medical College have reflected the lustre which they have shed upon it.

We have an additional reason for being glad to see you here. As good and patriotic citizens we wish to impress upon you the thrift and the business importance of our fair city. A quarter of a million inhabitants, and more, each busy with his or her own business, and some—as everywhere—self-burdened with that of others, constitute a microcosm of which we are very proud. Could we so far divert you from more serious discussions as to have a chance to exhibit our miles of beautiful avenues, whose arching shade-trees and magnificent residences constitute an urban dream, our three-score miles of smooth asphalt, or our hundreds of miles of railroad tracks inside our limits, I imagine we might almost tempt you to make Buffalo a national gynecological headquarters.

Ours is a point of no small historic interest. Long before the War of Independence the missionary, the Indian trader, the foreign soldier, and the native Indian had, each in turn, left his mark or his record in our local history. Only a few miles away, at the other end of this short Niagara river—or Niagára as the Indians called it—one can hardly dig anywhere without coming upon human remains, showing the bitterness with which this natural frontier was contested. Though the model "red man of the forest" of Fennimore Cooper no longer lives, if indeed he ever lived, and though the guttural accent of the Seneca or Tuscarora language no longer sounds soft upon the willing ear as it is supposed to have sounded in this aboriginal Utopia, nevertheless we could yet show you some of the descendants of the Six Nations with an accent more *gutteral* than ever. Indeed *their* medicine men are still seen upon our streets, though they belong to no school, know no code, and do not recognize gynecology, unless it be spelled with an "i" instead of a "y."

Buffalo has a commercial importance a full revelation of which would surprise you. A traveller to New York may take his choice from some eighteen through express trains, which depart every twenty-four hours for that suburb over five different railroads; at least seventeen virtually different lines centre here, beside which we have a lake trade which is enormous. Climatologically our country presents nothing superior, consequently the conventional Bison is as self-satisfied and contented—with the best of reasons—as mortal need be. Moreover, our proximity to Canadian soil makes this an extremely popular objective point with a class of people who travel rapidly and *incog.*

Our great show-place, of course, is Niagara Falls, which we hope to show you under pleasant auspices. Not alone their grandeur and beauty should engage your attention, their popularity as a resort for young tourists of a certain class is tremendous, and you should view them with feelings allied to gratitude, since one can hardly imagine how much work for those of your craft has had its inception there.

Of other points of local interest we have not a few, still their rehearsal need hardly detain you now, and I am not here to expound local geography. What interests you most at this time are

the important professional topics which you have come to discuss, while that which interests us most is, not merely the subject-matter of your deliberations, but that you may leave Buffalo with such favorable impressions of her citizens and her prosperity that you may be tempted at some time in the near future to select it as again your meeting-place. With a warm and sincere hope that such may be the case, and with our best wishes for a most enjoyable and profitable meeting, I shall conclude with every assurance that words may convey that you are cordially and heartily welcome. May everything conspire to favor you and bring you shortly into our midst again.

On recommendation of the Council, the following physicians were nominated as guests of the Society: Dr. Roswell Park, Dr. Charles T. Stockton, Dr. Stephen Y. Howell, Dr. W. C. Phelps, William S. Tremaine, Dr. Charles Cary, Dr. Herman Mynter, and Dr. M. B. Folwell, of Buffalo; Dr. Hunter Robb, of Baltimore; Dr. A. H. Buckmaster, of Brooklyn; Dr. George E. Keith, of London, England; Dr. J. A. Temple, of Toronto, Canada.

A discussion on the subject of the "Diagnosis, Pathology, and Treatment of Extra-uterine Pregnancy" was opened with a paper by Dr. A. W. Johnstone, of Cincinnati, followed by papers by Dr. M. D. Mann, of Buffalo, Dr. J. M. Baldy, of Philadelphia (the author being absent), and Dr. Charles Jewett, of Brooklyn (read by Dr. Skene).

The general discussion which followed was shared in by Dr. A. J. C. Skene, Dr. W. W. Jaggard, Dr. H. A. Kelly, Dr. M. D. Mann, Dr. E. C. Jenks, Dr. A. H. Buckmaster, Dr. H. T. Hanks, Dr. J. A. Temple, and Dr. A. W. Johnstone.

Afternoon Session.

After the completion of the discussion on extra-uterine pregnancy, Dr. Willis E. Ford, of Utica, read a paper on "The Question of Ampèrage in the Treatment of Fibroid Tumors by Electricity," which was discussed by Drs. Tremaine, Skene, Wilson, Keith, and Gehrung.

SECOND DAY.—*Wednesday, September 17th.*

Morning Session.—Dr. Henry T. Byford, of Chicago, read a paper on "Vaginal Fixation of the Stump in Abdominal Hysterectomy," which was discussed by Dr. Howard Kelly, Dr. William A. Polk, Dr. E. C. Dudley, Dr. A. J. C. Skene, Dr. Joseph Taber Johnson, Dr. J. C. Temple, and Dr. George Keith.

The President then read his Annual Address on "The Limiting of Childbearing among the Married."

DR. WILSON said: I cannot refrain from rising to express my thanks to the President for having brought this subject before us. To such a body of men, such a Society as we are, there can be no subject more important; and I may say that every word that has been uttered by our President is responded to by me most heartily.

I move you, Sir, that a vote of thanks be tendered to the President by the Society for having brought this subject before us, and having dealt with it in such an able manner.

DR. SKENE: May I be permitted to second the motion of Dr. Wilson, and in doing so say a word?

Some one has claimed that his success in life depended very largely upon the sagacity and good judgment that he manifested in the choice of his parents, and I am sure that we can with equal good judgment claim that our success has largely depended upon our wisdom in the selection of our presiding officer. He seems to be specially endowed for the office, in fact every inch a President; and while reading his address it occurred to me that he must be at least six-feet-two—so the inches are many. I am sure that we all appreciate the fact that we never had, and never could have, a President who could have chosen a more interesting subject than the one he has brought before us, to say nothing of the manner, which is beyond criticism.

It is most valuable and certainly most interesting to have a little of the psychology of gynecology thrown in with so much surgery—and I think that the President's Address was fully calculated to make our proceedings, so far, more evenly balanced—a little too much surgery perhaps, but it is all counterbalanced by the magnificent address which we have had. Much

more might be said to prove the charges which I wish to prefer against our President, but as he is from Boston, I presume he will admit them.

The motion was then put and carried.

Dr. Polk: The Society by this act expresses to Dr. Reynolds its thanks and appreciation.

"Injuries to the Ureters during Labor" was the title of a paper read by Dr. A. J. C. Skene, of Brooklyn, the discussion of which was adjourned until the afternoon session.

Afternoon Session.

Dr. Skene's paper was discussed by Dr. Jaggard, Dr. Johnstone, Dr. Kelly, and Dr. Byford.

Dr. F. H. Davenport, of Boston, read a paper on "Incontinence of Urine, due to Malposition of the Ureter." No discussion.

"Cephalhæmatoma" by Dr. Howard A. Kelly, of Baltimore. Discussed by Dr. Jaggard, Dr. Jenks, Dr. Polk, and Dr. Frederick.

Dr. T. A. Ashby's paper on "Drainage after Laparotomy" was discussed by Dr. Robb and Dr. A. P. Dudley, after which, on motion by Dr. Mann, further discussion was postponed until the following day.

Third Day.—*Thursday, September 18th.*

Morning Session.—The discussion of Dr. Ashby's paper was reopened by Dr. E. C. Dudley, followed by Dr. Johnson, Dr. Mann, and Dr. Wilson.

"Laparotomy for Intra-pelvic Pain," by Dr. T. A. Ashby, of Baltimore; discussed by Dr. Kelly, Dr. A. P. Dudley, Dr. Polk, Dr. Byford, Dr. Mann, and Dr. Johnson.

Dr. Edward Jenks, of Detroit, read a short paper on "The Resemblance of Some Forms of Benign Disease to Malignant," following which remarks were made by Dr. Polk, Dr. A. P. Dudley, and Dr. Mynter.

A paper by Dr. H. P. Hanks, of New York, entitled "A Report of my Recent Experience in Restoring Lacerations

Involving the Sphincter Ani by the Flap-splitting Method," was read by Dr. A. P. Dudley, in the absence of the writer. Discussion by Dr. E. C. Dudley and Dr. Polk.

Papers announced on the programme by Dr. H. C. Coe, of New York. Dr. Charles Jewett, of Brooklyn, and Drs. Richardson and Sinclair, of Boston, were read by title and will appear in their proper place in the Transactions.

The President closed the session with the following words:

GENTLEMEN: The hour has come for closing the Buffalo meeting. The members are certainly to be congratulated upon its success, and above all for the frank and incisive discussion, often widely divergent in opinion and yet at all times friendly, which has been so noteworthy.

We have to thank our invited guests for their kindness in taking part in the debates and thereby greatly adding to their interest, and not less our colleagues and friends who have cheered us by their unwearying presence and support. We want words for Buffalo itself, the charm of the city and its overflowing hospitality. We can but make for all that kindness our grateful acknowledgment. [Applause.]

It is a matter of deep personal regret that I may not at this moment present to you, according to our usual custom, my successor in office. He is one of the "innocents abroad," a bosom friend of Mark Twain; abroad now, and no doubt as innocent to-day as always heretofore. The last words that I heard him speak are still in my ears. At our happy assembling on one of the wide encircling wings that shut in the harbor of Boston, after hearing some banter about the city of his home, he rose and said: "Mr. Chairman, it is well known that the people of Chicago are remarkable for two things; in the first place they are all very good, and then they are all extremely modest." You know as well his twinkling eye and his genial features, as you do his hearty interest in this Society and his unfailing devotion to its work. You need then only shut your eyes to see in spirit, if not bodily, Dr. Reeves Jackson here present, and if the character and accomplishments of a President have anything to do with the success of this body, we may predict for it in the coming year unparalleled prosperity.

Dr. Wilson, of Baltimore: Mr. President, before we adjourn I would like to offer the thanks of this Society for the able, impartial and considerate manner in which our President has presided over our deliberations.

Dr. Dudley, of Chicago: In seconding that resolution I would recall a familiar quotation:

"Let others hail the rising sun,
We bow to him whose race is run."

The above motion was then put and carried, and the Society adjourned to meet in Washington on the third Tuesday in September, 1891.

HENRY C. COE,
Secretary.

CONSTITUTION.

I. This Society shall be known as the *American Gynecological Society.*

II. The object of this Society shall be the promotion of knowledge in all that relates to the Diseases of Women and to Obstetrics.

FELLOWS.

III. The Fellows of this Society shall consist of Fellows and Honorary Fellows.

The Fellows shall not exceed one hundred in number.

The Honorary Fellows shall not exceed ten Americans and twenty-five foreign.

Candidates shall be proposed to the Council one month before the first day of meeting by two Fellows, and shall be balloted for at the annual meeting, a list of the names having been sent to every Fellow with the notification of the meeting.

A two-thirds affirmative vote of all the Fellows present shall constitute an election, fifteen Fellows, at least, being present.

No one shall be eligible for active fellowship until he shall have submitted to the Council a paper on some subject connected with Gynecological Science.

HONORARY FELLOWS.

IV. The power of nominating Honorary Fellows shall be vested in the Council.

The election shall take place in the same manner as that of ordinary Fellows.

They shall enjoy all the privileges of other Fellows, but shall

not be required to pay any fee, or be allowed to hold any office or cast any vote.

OFFICERS.

V. The officers of the Society shall be a President, two Vice-Presidents, a Secretary, and a Treasurer, who, with four other Fellows, shall constitute the Council of the Society.

The nomination of all officers shall be made in open session at the business meeting, and the same shall be elected by ballot.

The officers shall enter upon their duties immediately before the adjournment of the meeting at which they were elected, and shall hold office for one year.

Any vacancy occurring between the annual meetings shall be filled temporarily by the action of the Council.

All officers shall be eligible for reëlection.

ANNUAL MEETING.

VI. The annual meeting of the Society shall be held at such time and place as shall be designated by the Society at the previous annual meeting. It shall continue for three days, unless otherwise ordered by a vote of the Society.

AMENDMENTS.

VII. This Constitution may be amended by two-thirds vote of all the Fellows present at an annual meeting, provided that notice of the proposed amendment has been given in writing at the annual meeting next preceding, and the same been printed in the notification of the meeting at which the vote is to be taken.

BY-LAWS.

PRESIDENT AND VICE-PRESIDENTS.

I. The President and Vice-Presidents shall discharge the duties belonging to their respective offices. The President shall be *ex-officio* chairman of the Council.

SECRETARY.

II. The Secretary shall attend and keep a record of all the meetings of the Society and of the Council, of which latter he shall be *ex-officio* clerk.

At each annual meeting he shall announce the names of all who shall have ceased to be Fellows since the last report.

He shall superintend the publication of the *Transactions*, under the direction of the Council.

He shall notify candidates of their election to fellowship.

He shall send notifications of the annual meetings and of the meetings of the Council.

TREASURER.

III. The Treasurer shall receive all moneys due, and pay all debts. He shall render an account thereof at the annual meeting, when an Auditing Committee shall be appointed to report.

COUNCIL.

IV. The Council shall meet as often as the interests of the Society may require.

Five members shall constitute a quorum.

It shall have the management of the affairs of the Society, subject to the action of the Society at its annual meetings.

It shall arrange the order for the reading of papers at the annual meetings.

It shall not have power to make the Society liable for any debts exceeding in total one hundred dollars in the course of any one year, unless specially authorized by a vote of the Society.

It shall have the entire control of the publications of the Society, with the power to reject such papers or discussions as it deems best.

The President, or any three members, may call a meeting, notice of which shall be transmitted to every member two weeks previous to the meeting.

The Council shall determine questions by vote, or—if demanded—by ballot, the President having a casting vote.

The Council shall constitute a Board of Trial for all offences against the Constitution and By-laws, or for conduct unbecoming an honorable physician, and shall have the sole power of moving the expulsion of any Fellow.

ORDER OF BUSINESS.

V. The Order of Business at the annual meetings of the Society shall be as follows:

I. General Meeting at 10 A. M. each day.

1. Reports of Committees.
2. Reading of Papers and Discussion of the same.

II. The Business Meeting shall be held at half-past eight o'clock P. M. on the second day of the session, at which only Fellows of the Society shall be present. The Secretary's record shall then be read; the Treasurer's accounts be submitted; the reports of Committees on other than scientific subjects be received; and all miscellaneous business be transacted.

PAPERS, ETC.

VI. The titles of all papers to be read at any annual meeting shall be forwarded to the Secretary not later than two weeks before the first day of the meeting.

No paper shall be read before the Society which has already been printed, or been read before another body.

All papers that may be read before the Society, and accepted for publication, shall become the property of the Society, and their publication shall be under the control of the Council.

QUORUM.

VII. A quorum for business purposes shall be fifteen Fellows.

DECORUM.

VIII. No remarks reflecting upon the personal or professional character of any Fellow shall be in order at the annual meetings, except when introduced by the Council.

ASSESSMENTS.

IX. Every Fellow shall pay in advance the sum of fifteen dollars annually.

Any Fellow whose subscription shall be more than nine months in arrears shall be reminded of the fact by the Treasurer in writing: in event of payment not being then made, he may, on vote of the Council, be dropped from the Society.

Each Fellow shall pay on admission an initiation fee of twenty-five dollars.

Any Fellow who shall neither attend nor present a paper for three successive years shall, unless he offers an excuse satisfactory to the Society, be dropped from fellowship.

AMENDMENTS.

X. Any of these By-laws may be amended, repealed, or suspended, by a two-thirds vote of the Fellows present at any meeting, *provided* previous notice in writing has been given at the annual meeting immediately preceding the one at which the vote is to be taken.

PAPERS

READ AT THE

FIFTEENTH ANNUAL MEETING

OF THE

AMERICAN GYNECOLOGICAL SOCIETY,

HELD IN THE

BUFFALO LIBRARY,

Buffalo, N. Y.,

SEPTEMBER 16, 17, AND 18, 1890.

THE PRESIDENT'S ANNUAL ADDRESS.

By John P. Reynolds, M.D.,
Boston.

The unchanging success of the Society gives all its friends ground for honest congratulation. In individual life fifteen years mean adolescence fairly begun; here they imply not only the strength of youth but all its glorious promise.

The twelvemonth has not left us untouched. William H. Byford, a founder of this Association, and always an active and valued member, will no more share its work. A memorial of Dr. Byford, recording for us and for others his honored career, has been prepared by one of our colleagues, and will be found among the *Transactions* of the year. Were it not for this sad loss our ranks would remain—praise be to God!—unbroken. Each and every other, younger and older, reports himself to-day ready for duty. The pleasure of greeting once more these trusty friends needs no words.

With a deep impression of personal insufficiency I bring before you a topic somewhat foreign to the usual character of the annual address. The grave importance, public and private, of the subject on which it bears will, I hope, sufficiently excuse my choice. No one can more regret the fragmentary and necessarily unsatisfactory treatment which it must receive.

Marriage, which is at this moment under eager and widely extended debate, too deeply concerns every human interest to permit indifference to that discussion: on the issues involved every man feels the need of clear teaching and of deliberate convictions. To attempt within the limits of the annual address

a general review of this question would be gross presumption ; but such attention as has been at my command has made the conviction every day stronger, that the crucial element in the inquiry, the one factor upon which every conclusion must in the end hinge, is the ever-recurring matter of childbearing.

Our subject is, then, "The Limiting of Childbearing Among the Married." We have, however, to-day no fresh lance to break at the well-known infamous practice of our time. On the contrary, did there exist contrivances for preventing impregnation, sure, accessible, and utterly harmless, what I have to present would come all the more sharply outlined.

Honest inquirers ought to covet eagerly on these points the judgment of assemblies like this. Throughout your professional lives you have watched at the closest quarters and under every varying condition marriage and childbearing as no other class can.

We will shut wholly out of view the misleading issues drawn from the family of the drunkard, the improvident, the phthisical, or the insane, and will equally forget every case in which, for medical reasons, sound and well considered, pregnancy ought to be interdicted or seldom allowed. These form a wide field for the counsels of the sagacious practitioner; but to our inquiry they hold no relation.

We are to take up the following instance: A man and a woman have married, neither prematurely nor too late, in the fulness of health and strength; each of them free from any inheritance of disease; trained well and wisely in body and mind; with adequate means of support; in a union just, equal, and loving; and in character too upright and worthy to palter with any known wrong or dishonor. To these parents, as to others their like, belong sons and daughters eight or ten, or thereabout.

The husband and wife just described will not interfere with that result or substantially change it. Separation, for periods longer or shorter, may perhaps be mutually accepted. In repeated instances this is honorably maintained; but with the

great majority of young, strong, and well people, living together, it is impracticable, and where unwillingly enforced it becomes in all time the fruitful parent of every form of degradation and immorality. Such separation excepted, these people have no control.

The statements of this paper refer exclusively to the parents thus before us, and to their family. No criticism will hold that sets aside this restriction.

Does, then, any statute make all these children obligatory? Surely not. The loftiest purity, the highest nobleness may well be set before men, though no penal legislation make them binding. Marriage, the marriage of this man and this woman, establishes a home where parents gladly train those placed in their care, paying back to others the love that was once lavished on them. The ten children may not always be found: "There is no fold, howe'er tended, but one dead lamb is there"; but the demand is, that there be hearts open for all that God will give, that their coming be welcomed, counted a blessing unspeakable—never be matter of dread. For long years there has rung in my ears the word of one of the noblest of women then in the height of the mother's struggle of bearing, nursing, and rearing a family of many sons and daughters: "Oh! if I must think that any other creature did this to me—that it was my husband that appointed it for me; if in it I did not see God's hand, I could never endure it." Pardon me if I tell the rest; I was the physician. The births were hard, even to see; labors of a strong, mighty mother. There was never any miscarriage. And I have watched that family. Not one failed. There came no great sorrow. The children were noble men and women; love between them was never wanting. The mother lived through it all, it seemed to me, in that spirit which has been the inheritance of the ages: "Behold the handmaid of the Lord; be it unto me according to thy word."

The varying interpretations of the original motive and

purpose of marriage must in passing receive some consideration. They will appear closely related to our special theme.

It is hardly possible to distinguish too sharply the conception of marriage from the mere relations of passion.[1] Overwhelmingly powerful as is the sexual impulse, it is idle to build upon an instinct so quickly and easily gratified the entire framework of social order. Thus primeval man, in his struggle for existence, had other needs more permanent and far more pressing. We know no stronger distinction between animal and human existence than the use of fire. That alone means for man better nourishment, makes him a flesh-eating animal. The ensuing preparation of food creates a division of labor that the animal never knew. Woman must get ready the prey which man now regularly provides. She becomes to him indispensable, not on account of an impulse suddenly aroused and as quickly gone, but from a necessity that lasts as long as life itself: his hunger. The union thus formed is monogamous; there exists no motive for plurality. It is also enduring. Did marriage rest only on sexual impulse, permanency could not be expected; but admit the need of establishing a household, add the birth of a child, require from the mother care for that and its training, and all is changed. Primitive marriage cannot have been largely tender. It was as hard and dry as primitive life. Compensations primeval man no doubt had; but how bitter was the desolation! Famine and cold were ever at hand. His cave and his hut were but little better than those of the neighbor lions and bears. Pride of ancestry he could not know. Yet in him lay even then the striving for all that has made his posterity brave, loving, and wise; powers destined to bring under stern control his animal nature, and to lead on the individual and the race to a future of glory and greatness of which the end is not yet.

[1] Starcke: The Primitive Family. From this excellent book the thoughts, and in a few sentences the words, of this paragraph are largely borrowed.

In that life the old and his infirmities found no place. Remorselessly killed, left alone to die, at times praying to be destroyed, that he might not longer bear his need, he was a companion in wretchedness of all the feeble and deformed, and of that child who is never other than helpless and weak. In these ages, and hardly less among savages to-day, child-murder is everywhere common. At birth relatives decide whether the infant die or live. In one tribe every child of a mother not yet thirty is killed; in another only the first two live; here nearly every girl child dies; there the first-born is sacrificed to some dead relative's shade, or in honor of a deified ancestor. Polynesians, only a century since, though no Malthus had lived, anticipated his teaching. "Their islands were so small that unless children were early made away, famine would surely come;" and the child, kept alive, like a calf or a kid, till old enough, as a rule till it could walk, was then killed by its parents, cooked and eaten, often in the very hut that had seen its childish play.

Civilization, bearing witness to the ever-growing light, undoes all this, cares for and cherishes the sick, the infirm and the old, trains the feeble in mind, watches for each littlest child, will have it that nothing be lost, prizes those infants that the savage would kill and eat, seeing in them the very image of God, and glories in that prolific exuberance of creation which alone makes possible the wonders of natural selection.

Those on every side who seek the abolition of marriage, or such alterations in its form as will make it virtually cease, have no patience with what they call sentimental pleading in its defence. Such a family as I have described they would condemn with scorn. Their thronging abettors and associates, the outspoken worshippers of Venus and Bacchus, are troubled by no scruples for man's asserted need of permanent monogamous union, and find in the mother of a large family something beneath contempt—a mere figure of fun.

The marriage love of these writers, under whatever more

acceptable terms disguised, is nothing if not in a high degree passionate and sensuous. Sexual appetite is for them the groundwork of the union, and its gratification a purpose never forgotten. Accept this, and the folly of marrying becomes transparent. Desire, transitory in nature and soon appeased, cannot call for a prolonged and indissoluble union. If to gratify that instinct be the only end, satiety soon ensues. Love, or what bears its name, must next seek freedom, and divorce must pave the way for fresh, joyous excitement.

Moreover, man's "fatal sense of power and possession" in marriage is matter of bitter complaint. Could woman be only free to take herself away, there would be joy in keeping her; she would not lose her charm. Marriage must by no means bring children that might keep the mother tied; above all, not many children. Unless she decide for children, they are not to be born; being born, they are not treasures jointly owned, but belong exclusively to the mother. "Unwilling motherhood"—that the mere fact of marriage should imply childbearing—is of all marriage cruelties the last and worst. When marriage reform has come, woman will yield herself to man merely when she choses and exactly to the extent that she elects; he may expect children only in case she so decides, and then just the few that she permits; and this principle, pure and simple, is declared to be that last ditch from which marriage reformers will never fall back. In all these affairs man's choice will apparently not count.[1]

[1] Fairness perhaps requires that we contrast with these last sentences the following parallel words. They with others in the immediate context are thought to warrant fully the paraphrase above introduced:

"It need scarcely be said that there must be a full understanding and acknowledgment of the obvious right of every" [married] "woman to give or to withhold herself body and soul exactly as she wills. The moral right is here so palpable, and its denial implies ideas so low and offensive to human dignity, that no fear of consequences ought to deter us" [agitators] "from making this liberty an element of our ideal—in fact, its fundamental principle." "Marriage," Mrs. Mona Caird; The Westminster, August, 1888.

Readers of that paper; of "The Morality of Marriage," Fortnightly, March, 1890; and of articles upon this question in the North American for June and

In Emerson's words: "The lover seeks in marriage" her "[his] private felicitation and perfection, with no prospective end; and Nature hides in" her "[his] happiness her own end, namely, progeny, or the perpetuity of the race." But not such the wife of days to come; for her, Nature will at least do no hiding; in woman Nature will have found more than a match.

It is even hoped, we are told, that "overwrought maternity," the joy that sees in each latest offspring only something dearer and better than all before, will, on a more free development of woman's other attributes, be stifled or held in check; this instinct being a product of man's tyranny, cultivated by him to the dwarfing and stunting of woman's nobler powers.

But against childbearing there are fresh indictments. Is the more equal marriage of the future to free woman from every legal and social subjection of man's devising? The bearing, nursing, and rearing of his and her children will involve a subjection, just and equitable, it may be, but none the less real. Is woman's economic independence to be made good, that in this respect she may stand with man on an exactly equal footing? The bearing of children during the best years of her life hopelessly handicaps her in all competition with him, mechanic, literary, or commercial. Will woman stimulate and develop to the utmost artistic or intellectual powers; will she become man's open rival in art, in scholarship, in public life? Any free bearing of children must first be put out of the way. And accordingly great and varied interests demand that childbearing cease, or that it be restricted within limits that virtually end it.

It requires some hardihood, in the face of all this, to maintain, as I assuredly do, that the exact opposite is true; that the happiness and peace of the parents of whom I speak, the

July of the present year, the work of the same spirited pen, will perceive in the address frequent reference to these writings and occasional quotations from them.

welfare of the family, the glory and strength of the State, alike require all such women and men to permit no other restriction of childbearing than that which belongs to rational self-restraint, to mutual forbearance and tenderness in all the exigencies of married life; admitting always that the inmost soul and spirit of their union condemns every act of marriage which does not find its warrant in love.

Who has not seen in families the growing apart of husband and wife when the avoidance of pregnancy begins? There are noble hearts that under such trial grow only more tender, but how often does that prohibition lead the way for the new lover or for the wife of whom no one hears. Sorrow and suffering lovingly shared, the straitening of resources, the widening of care; these are privileges under which hearts ripen. In the new and daily-varying interests of the great group of daughters and sons, ever opening out, are found for man and woman the deepening of character, the loss of self-consideration, the joy and the content of living for others and in others. Nor need we, in the midst of this all, undervalue for elders the homely peace and blessing of Thackeray's "kindly nuptial bed." Old Etruscan couples in the infancy of civilization could carve in stone no dearer image of long-enduring rest.

Time and again you have known the heartrending agony of parents that through wilfulness, or folly, or thrift, had foregone recurring childbearing, and when bereavement came, forever refused to be comforted. In great families how gently and mercifully do loving hearts that remain draw only closer that they may fill the gap!

Deep as may be the needs of the Soudanese or the Ugandas, better missionary work can hardly be done than that of the woman who among us faces obloquy and scorn, and takes joyfully her burden of training for noble service a troop of daughters and sons.

The demand for divorce is a vexation alike to the nation and the church. Its all-potent cause is the restriction of

childbearing. He and she who have many children can spare no time for disagreement and divorce. With every fresh child a new guarantee against separation is born. In childless communities divorce finds a congenial home.

To children themselves the crowded family is an even greater gain. What training that elders can give matches the rough-and-tumble of a houseful of boys and girls? Will staid parents, a generation older, ever set on foot the merry pranks that are themselves an education? How does the love of many brothers and sisters supplement and round out the kindness of elders! How do prospering children lend helping hands to those who struggle! Nay, how great a blessing is that struggle! Remember Abraham Lincoln's words: "The Lord must love the common people; He made so many of them!"

When but two children are born, the parents' place is not made good. Four barely restore in adult life the father and mother. Such rates of birth mean for the community, the State, the race, narrow resources, penury of power. Only with the prolific home does strength to face the enemy at the gate begin. We delude ourselves with phrases about race deterioration and the infertility that cannot help following high civilization; the causes lie deeper. Fifty years ago the development of well-to-do Frenchmen, Germans, and English was not unlike; yet the family of Napoleon the Third and that of the reigning British sovereign not unfairly represent habits and traditions of two peoples. "*Mais, elle ponde comme une poule!*" I heard my French obstetrical teacher say, after one of the later royal births. In what land has the hive been so full that swarming could never cease? What nation has been compelled to found in Australia, in India and on this continent fresh empires? "That famous man, the greatest sailor since the world began," was tenth English child in a family of eleven. "Poor Richard" was one of seventeen, himself the fifteenth; during five generations his ancestors had been youngest sons of youngest sons, no doubt

in ample households. These and many another priceless in public worth had their training in great families and polished away oddities and angles in the elbowing and pushing of thronging sisters and brothers. The wealth of countries is not in money or in mines, but in their women and in their men. Every added hand is a fresh producing power.

"Away," breaks in the objector, "with your ideal of marriage and your childbearing: picturing first to yourselves as you do, what the world will never by any chance see; and then making of this fancy a Procrustean bed to which all families must be shortened or stretched, whether they choose or not."

"The real," says a late able article,[1] "is but the ideal not yet completely developed; and the ideal is not merely the goal toward which the real is tending, but its actual groundwork."

From a writer on the marriage question, an Englishwoman, whose short paper in last April's *Fortnightly*[2] seems to me pure gold, I quote the following words:

"Of the new marriage, as of the old, it assuredly will remain true, that the improvement of the pattern will not greatly avail if the material be bad. Worthy relationships can only subsist between worthy human beings. Too many men and women in our so-called civilized life are not civilized at all. They are not controlled by any sense of equal rights on the part of their neighbors; they have no reasoned principles, and are in effect led by the impulse of the moment. People of this sort—there are quite as many such women as men—and no small proportion of them belong to the middle and upper social classes—are incapable of the sort of companionship which seems to me the only marriage worth having. They are also incapable of any worthy friendship, and they are eminently unfitted to have the charge of children.

[1] Lux Mundi: The Church. Walter Lock.

[2] On Marriage: a Criticism. By Clementina Black.

For persons in this stage of social development, equal freedom in intimate relations is not possible. They will inevitably be more or less tyrants or slaves; and they will be happiest, it appears to me, when they are kept under control by a not unkindly tyrant. On the other hand a certain degree of freedom is necessary to the development of the partially civilized. Responsibility educates and fits for responsibility."

And again: "In the lowest stratum of our population marriage virtually does not at all exist. The essential elements —fidelity and a sense of mutual duty—are absent. Moral chaos reigns as to the relations between man and woman. At the other end of the scale we find a highly-civilized class of self-controlled men and women imbued with respect for one another's freedom of action, and so educated that their principles of conduct, intellectual interests, and general outlook on life are pretty much the same. . . . But then in the majority of these cases[1] the wives are highly-cultivated women, in the truest sense the equals of their husbands."

In the development of marriage woman's purity was early seen to be indispensable. But the marriage of the future will equally exact the strictest purity from man.

"Women," says one of their sex,[2] "if dependent upon men, must, almost of necessity, condone men's vices, and, as a result, gradually approximate to their standards. The fact that we are morally upon a higher level than men repels us from the close relations of marriage, in which we now believe that we have a right to a return for all that we give. If, while we are offered intellectual companionship and provision for our bodily needs, the higher demands of our spiritual nature are ignored or set aside, we hesitate. Our moral life, the life of our aspirations, is upon a plane which the average man has not reached. We stand ready to welcome him when-

[1] Reference had been made to marriages at Cambridge, during late years, of younger Fellows of Colleges.

[2] "The Mission of Educated Women." By Mrs. M. F. Armstrong. Popular Science Monthly, March, 1890.

ever he can bridge the chasm." . . . "Women require of the fathers of the next generation just what Mr. Grant Allen demands for the mothers: that they be as strong, as wise, as pure, as sane, as healthy, as earnest, and as efficient as they can be made."

When Mr. Grant Allen, in his widely-known paper,[1] urges for women the importance of motherhood, one watches with interest his intelligent critics of the fair sex, as they shine in the retort courteous and, throwing back his very thoughts, reply: "The customs which render it difficult for a young man to marry, which send him hither and thither to gain a fortune, succeed in a profession, or dissipate his strength, when he should be choosing his sweetheart, are harmful and divert the attention of men from the true problem of their sex, to fix it on side issues of comparative unimportance."[2]

The trenchant condemnation of men to which a moment ago your attention was drawn may possibly find some warrant in fact, but one can hardly pass by without indignant challenge certain gross overstatements of universal male impurity, which, recklessly spread abroad, have done great wrong, and created among pure women no little unhappiness and terror. May the demoralized life of certain districts of Europe, which alone gives color to these reports, never find here its counterpart!

We hear it urged that much sexual evil is due to ignorance, and it is gravely proposed to make the world more pure by explaining the structure and use of the reproductive organs to children at school. Obviously, two very diverse matters are here hopelessly confused—pregnancy and childbearing and a knowledge of sexual relations. In fairly large families the birth of children, the coming of nieces and nephews, the unavoidable incidents of daily life, give to the young under

[1] "Plain Words on the Woman Question." Grant Allen. Fortnightly, December, 1889.

[2] "Is Education Opposed to Motherhood?" By Alice B. Tweedy. Popular Science Monthly, April, 1890.

the gentlest and kindest teaching ample acquaintance with reproduction. It is far otherwise with the relation of the sexes. Curious interest in that subject will only be set at rest by the sexual relation itself, that relation which nothing but marriage must warrant; and without which instruction, however communicated, does but whet the appetite for farther knowledge. The greater information acquired by boys is no unimportant factor in that low moral standard of their sex of which these crazy reformers so loudly complain. For the young of either sex, it will at least never do harm to be simple concerning evil, and above all, to be wise unto that which is good.

All of us have perhaps now and then seen unhappy girls immature in character and unbalanced, whose stormy and threatening youth presaged ruin, but whom marriage, multiplied childbearing, and the tumult and care of a great household, developed into strong and useful women, as nothing else could—not, as lookers-on thoughtlessly say, thanks to the worry and toil, but far rather from the fact that strong desire having been early relegated to its properly subordinate place, the nobler instincts found room, and in tender love and care for others the beauty of motherhood slowly made itself felt; as breaking sunlight drives before it foul mist and lingering cloud till at last stream and hilltop stand out in all their remembered charm. Without children, marriage would have probably brought to these unfortunates nothing but evil.

The denunciation of improvident marriage has its limits. Strictly provident marriages, the unions of a few persons of great wealth, or in royal and imperial families, are too infrequent to count. For the early wedded, marrying with an ample income is, even financially, the very poorest pledge of success. To call that marriage improvident to which young people bring sound bodies and minds, and the man both capacity for labor and steady employment, is an outrage; mercifully, the weight of family burdens comes only little by little, as years roll on. The marriage, early in life, of per-

sons like these demands every encouragement, alike in the interest of private and public morals, for individual happiness, and for the safety of all. Men may well echo Bacon's words: "He that hath a wife *and children* hath given hostages to fortune."

For one and another all-absorbing service, noble and attractive women have in every age laid aside marriage, many a time with a loving appreciation of the beauty and sacredness of motherhood that has but deepened the sacrifice. Under the well-known sorrows and uncertainties of life others at last forego what they deeply prize, and in their accepted self-denial, tenderly borne, daily glorify womanhood in thousands of homes with an honor second only to that of the mother herself, if second at all. Woman may also decline marriage, and have her question of self-support to face. Show watchful and generous forethought! See to it, that an unwritten law so bind the conscience of every parent that no child of either sex, whether born in want or cradled in ease, grow up without acquiring beside the nurture of the mind some handicraft or other human pursuit that will yield maintenance.

Reformers scout the thought that in marriage the general interest of a family may rightly hold in check woman's individual will; or worse, marriage give to even a wide circle of kinsfolk binding rights and claims. Fidelity in wedded life, which for them masquerades as "stern, inexorable duty" cannot be in keeping with honest freedom in love. "Virtue," if under any external control, or helped by any propping from without, they hold of small account; since all goodness that is not utterly spontaneous is worthless.

Who of us may not hourly give thanks that loving hearts at home, and many a gracious help from honorable ambition and honest pride, stand near to reinforce our tottering spontaneous good! Between marriage and individual liberty there is no true conflict. The service which is perfect freedom finds there its like.

Very many of you know in a gay European capital a gigantic hospital in whose obstetric department from nine to ten thousand children are each year born—an average of one for every hour. Of the mothers, only four in a hundred are married; and so little is marriage good form, that the married often conceal that fact. A large part of these women are domestic servants, go to the hospital for delivery, frequently more than once, and yet, if otherwise of value, are gladly taken back by their employers. A friend, thoroughly conversant with life in that city, said: "I do not see how a servant could marry; I never knew one that did." I heard at a hospital morning visit the question, "*Das wievielste Kind?*" put to a thin, anxious-looking woman no longer young. "*Das sechste, Herr Professor.*" "*Das sechste, und doch noch ledig!*"

Why is not this "the marriage of the future" already come? Here is no jealous "possession" by man. To these women "freedom in love" might be "as the very breath of their nostrils." Surely they are not prostitutes. Delivered, their power to support themselves is as great as before, and their social standing not in the least harmed. For the children they have no worry; a paternal government long watches over the offspring.

Dare any man or woman in this room call such a state of things progress? That degradation is due to the enforced celibacy of thousands of soldiers and priests, and equally to a law which, without a fixed income, forbids marrying. Such cruel laws may be done away; domestic service itself, with all its evils may, according to the promise of one of our clever countrywomen,[1] speedily cease, changing into an outside organized industry; in time, drunken women and men may become temperate and self-controlled, fitted to be again parents: the improvident may learn thrift; under wisdom and skill diseases which now forbid childbearing may disap-

[1] The Housekeeping of the Future. By Mrs. H. E. Starrett, of Chicago.

pear; but bring all this about, and much more like it, for the very end that troops of happy children may fill the homes of these now sorrowing neighbors, just as crowding sons and daughters are welcomed for those brighter unions of which so much has to-day been spoken.

The mother for whom this heavy burden waits, needs from all about her not only honor but deep and abiding sympathy, comfort, and help. She asks it most of all from our profession.

Great changes in the bodily training of woman, in her attire, in the cultivation and equipment of her mind, are surely close at hand. Steady gymnastic work, the bicycle, and outdoor games will not fail to tell. I know no reason why she may not show herself in her way as strong as her brother. The paw of an enraged lioness would hardly be less frightful than that of her mate. The desire to please may yet preserve woman's flowing dress, but undergarments like those of the gymnasium cannot be long delayed. That harming of the waist for which thousands of years have striven will be done away. The training of her mind may well make her the intellectual equal and companion of man; true though it be, that the school-work of to-day too often scorns the remembrance that she is the mother of all living, and in an aggravated sense unfits her to be that mother. You will perhaps echo the conviction, very firm in my own mind, that fine sons and daughters, with vigorous minds and tough bodies, oftener owe their excellence to their mothers than to their fathers; sure it is, that the gain of the race will never be truly admirable till more earnest care is given to the bodily training of girls. It is a true appreciation of the greatness and honor of childbearing that asks for the mother of children the stately form, *die hohe Gestalt*, of Dorothea, as she is seen in the evening light first stepping over the threshold of Hermann's home.

The mother of women and men must be spared every other toil, must be refused all strange and unfitting care. During

pregnancy she may not edit a dictionary, sit up till the early hours to hear her husband's sermons or read his proof, help to tide over a bankruptcy, or herself keep a hotel. "But for the children" (six), the wife of a shopkeeper is made to say, "I would take chloroform to-morrow." We are then told how, under great worry and distress this wife had built up the business and carried it on, while she bore the children; and it is thereupon laid down that there should have been no such childbearing. But the evil lies at the door, not of the childbearing, but of the shop. The woman with child cannot —nay, on every ground, must not—do the work of a man.

A fitting acknowledgment of repeated childbearing as an honor and trust, than which earth knows no greater, and the appropriate watchfulness that such a recognition brings, would make much less common that disaster which more than all others enfeebles childbearing women. What record of eight or ten children does not include a list of miscarriages? Unless in the family of careful physicians one rarely finds the exception. For thousands of years our profession has visited with loathing and scorn him who helps the murder of the unborn, and hardly less the mother who permits it; but the honoring of childbirth demands, far beyond this, that the woman who is to bring forth, do duty for her child, as the outpost does for the sleeping army, that she bear ever in mind its feebleness and its risk, that she watch for it as the mother bird on the nest, and this over and over again, it that may be.

What words of upbraiding and shame befit the physician, be he older or younger, whose counsels tempt instead of strengthening the mother of two or three children, before whom the prospect of other recurring pregnancies lies! How hard is the struggle, no matter how favoring the conditions! Not only is there heavy and scarcely remitting care, but to meet the claims of the nursery, many an innocent happiness that has been before enjoyed must be hopelessly postponed. The camping-out of earlier days, journeys on horseback or on

foot, many a pleasure of social life, are no longer possible. Yet in the glad acceptance of just these privations lies hidden for this woman joy to come that words cannot exhaust—her crowd of eager faces and loving hearts that will make glad her riper years; and the opportunity for all that, if lost in this its day, will never return. What the devilish suggesting of a possible forgery, or of a cruel breach of trust, means to a man trembling at the verge of financial ruin; what it would be for a patriot to skulk or fly at the extreme moment of the country's peril; just that the medical adviser prompts, when he whispers to this mother the expediency of a judicious curtailing of childbearing; when he puts in her way my imagined safe method of prevention.

We neglect the more important division of our care for this woman if we content ourselves with answering her summons when labor comes. If we be not watchful that during pregnancy she sleep, if we do not our utmost to secure for her peace of body and peace of mind, if we be not on the alert in the more strictly medical supervision of this period, post-partum service, however assiduous, will never acquit us. To forestall danger and to prevent it are worth far more than the most superb self-reliance and courage when peril has come.

The suffering of labor begins to find its place even in fiction. Impatience of pain, indignation that it must be met, demand that it be either prevented or avoided, may not be the spirit of the noble army of martyrs, but it is on all sides displayed. On many grounds it behooves male physicians to make to this temper all reasonable concessions. Exempt as we ourselves are from the agony of childbirth, we must not, without the gravest reasons, withhold from those who suffer it the opportunity of innocent relief. I find it hard to excuse our growing supineness in regard to anæsthesia in ordinary labor. There are few prejudices more utterly unfounded, than our timidity about this resource. Not only does the careful and judicious administration of ether in confinement not augment

the liability to hemorrhage; it unquestionably lessens this risk by saving that nervous power which the unrelieved endurance of pain exhausts. In everyday childbirth, and still more under intolerance of suffering, or where pain is in fact extreme, anæsthesia is of priceless value. The one indication for it in average labor is intolerance of pain, whether the distress be really excessive or not. Often those who urgently need ether in the wretchedness of the early stage, and then thankfully welcome it, can bear the expulsive efforts without it or at that time scarcely require it. Those practitioners who withhold an anæsthetic during the earlier suffering, amidst entreaties for relief, and then timidly permit a little in the later pains, have no right to expect help from it and may often look for uterine relaxation after its use. The moment the endurance of pain, in whatever stage, begins to tell upon the condition of the patient and to make demands upon her courage, the time for ether has come. It is then bad practice, and I think clearly wrong, to deny it. Thus, in my judgment, a consultant called to a case in which the constricting obstetric ring has developed, may well first ask, "Was anæsthesia with this patient early established and afterward maintained?" If not, it is my belief that the attendant has not done his best to ward off the accident. I protest most urgently against the neglect of anæsthetics in hospital and dispensary obstetrics. It is said that such patients can do without anæsthesia. For the increased safety in the conditions of labor which it brings, they might well demand it as their right.

The attendant, be it understood, is not, in ordinary cases, to employ ether till the farther endurance of pain seems to him unwarranted; he should then give it only during the pain, never continuously; he is to use it only as a palliative, the patient's intelligence, or, at any rate, her power of speech, remaining, as a rule, undisturbed. Even within these limits it is of inestimable worth. What is here said of ether is no

doubt equally true of chloroform, but I cannot assert that from personal knowledge.

We all recognize the unspeakable benefit of anæsthesia in operative obstetrics and in eclampsia. Carried during labor to the surgical degree, it probably always implies some risk: but this use of it is not to-day before us.

The obligation to keep up medical supervision during the hour and a half following delivery is widely accepted by the best obstetric guides. Would that its extreme importance might be universally admitted!

It is not proposed to recount here the safeguards that come from late wondrous improvements in our art. You well know how invaluable these are. Early in this century the late Austin Flint, the elder, was a young practitioner. The following memorable words are found in a letter written to him fifty years ago from Northampton, in Massachusetts, the town where once Jonathan Edwards lived and labored: at the time of the correspondence one of the leading places in the western part of that State. "A.," says the lady writing, "has lately died in giving birth to her first child. This is the fourth case of a similar kind which has occurred among my acquaintances since your little Austin was born. I do think the gentlemen of your profession cannot give too scrupulous a degree of attention to this subject." Contrast this with the record of a thousand distressed, half-fed, deserted women, out-patients of the Boston Lying-in Hospital in the last two years; the one death taking place six days after birth from pulmonary disturbance, and possibly due to causes not connected with the labor, while among the remaining patients there was hardly a disturbance of convalescence. I need not hesitate to make this statement, since like success has been reported from many another point. Nothing that has been heard in our meetings more won my heart than the brave retractation of that noble veteran, our lamented Dr. Ellwood Wilson, when he reported six cases of children saved in his hands by axis-traction, every one of whom he felt sure

would have died but for the very instrument whose employment he had two years before discredited. And who is there among us, that, as he recalls past professional life, has not the pain to remember children that increased presence of mind on his part, more thorough understanding of the mechanical powers at work, greater adroitness in manipulation, would have saved from death; the sad memory of them following us through all our years. Surely, "gentlemen of our profession cannot pay too scrupulous attention to this subject." If we enjoin upon the much-enduring mother tenderest care that not one of the least be lost, we likewise clearly need to make that lesson our own.

Our duty to this mother of many is not yet told. To the parent the reckless night-nursing of children is an unmeasured evil. I have known it to become in a twelvemonth the unquestioned and only cause of death to a mother of good inherited health, and of fine bodily and mental endowments. Year by year women are breaking down under it before your eyes and mine, without the least occasion. What weariness and distress of woman and man might be spared could we make it everywhere known that after the earliest weeks well-taught babies almost without exception sleep through the night as do their fathers and mothers! You smile, perhaps, at my presuming to introduce here a matter so trivial. Trivial it may be called. It is my conviction, that a generation so trained in its early months would thereby gain inconceivably both in mind and in body. There cannot be question of the increased approval of childbearing among parents whose peace is thus secured.

"Extirpate," cries the most ardent of marriage reformers, "extirpate the enchained ideas that marriage necessarily implies children, and motherhood the power of rearing and training them." It has been the design of this paper, it should be the hearty wish of us all, to enchain to the utmost the convictions that marriage does imply childbearing; that the marriage of upright people, strong in mind and body and

so remaining, involves always many children; that the true education of woman's body and woman's mind has, for its first aim, to give with motherhood the power nobly to rear and train offspring.

"These are the gems my children gave,"
The stately dame replied;
"The wise, the gentle, and the brave
I nurtured at my side."

DISCUSSION OF THE DIAGNOSIS, PATHOLOGY, AND TREATMENT OF EXTRA-UTERINE PREGNANCY.

By Arthur W. Johnstone, M.D.,
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Mr. President and Gentlemen: In the acceptance of this responsible position it is not my intention to give you a history of our subject or what could in any sense be called a "library paper," but to express briefly my own views on some of its moot points, knowing that thereby I will cross the opinions of many and thus open up the way for a free discussion of this now most voluminous topic.

Before speaking of the pathology of extra-uterine pregnancy, I hope you will bear for a few minutes what may seem like an elementary lecture on normal pregnancy.

The amœboid state is the first picture in the life of all viviparous animals. Immersed in a properly tempered and proportioned nutrient fluid, all alike from the first segmentation go on to the formation of hypoblast, epiblast, and later, the mesoblast. With various modifications, all after the same general plan go forward in the manufacture of their envelopes and temporary organs necessary to the intra-maternal existence. But up to a certain point all that is asked of the mother is to furnish this properly-conditioned fluid.

But to all there comes a time when osmosis fails to bring the proper amount of pabulum and to remove the products of combustion. Unless by a new provision these dangers are overcome the new life is extinguished either by asphyxia or

starvation. By the association of the maternal and fœtal circulations in the various forms of placentæ this danger is averted.

You are all, no doubt, growing restless under this first-course lecture. But in the reproduction of this timeworn sketch I hope to show that there is one point that has not yet had due consideration.

It is, whence comes this first nutrient menstruum? Most authors write as though they thought it always present in all animals, and that all that the fertilized ovum has to do is, at any time, to drop into the maternal passages and find them ready to receive and nourish it. Excepting in man and in some of the monkey tribes, I know this to be a gross mistake.

My studies on the comparative anatomy of the endometrium have forced me to the conclusion that in the lower animals at no time, except when the rut is on, can this nourishing lymph be furnished, and without it a pregnancy is impossible. It would take too much of your valuable time here to go over this work in full, but those who care to read it can do so in the November number of the *British Gynecological Journal*, for 1887.

In the human being, however, the rut is sempiternal, and, as might be expected, the endometrium is always ready to pass into the myeloid state, and at the same time to furnish this nutritive fluid, consequently pregnancy occurs at any time.

The tissue which furnishes this food, and afterward makes the placenta, is the layer of adenoid tissue subjacent to the lining epithelium. In the human it is always pulpy and filled with lymph, until displaced by menstrual blood. In many of the quadrupeds, however, except during the active condition produced by the æstus, it is little more than any other mucous tract. It is sealed up by many layers of protecting epithelium, while in woman there is but one poorly-developed layer which is shed once a month, and presents but a poor barrier to the underlying fluids at best. So then,

to come plainly to the point, my belief is that it is the transuded lymph of the mother that sustains the fœtus in the first stages of its development.

This, I know, is rank heresy, if we are to follow the past generation of physiologists, but since we know that their generalizations on Remak's law are fallacious, I think we are free to follow the laws of common-sense, and to believe that the utricular follicles are more for the purpose of increasing the transudation surface during menstruation, and slightly modifying this lymph during pregnancy, than for the wholesale secretion of it.

Stated clearly, then, my belief is, that wherever a true lymph is furnished a fertilized ovum can exist. The adenoid tissue which furnishes this fluid lines not only the uterine cavity, but also the Fallopian tubes to the very extremity of each fimbria, and on the lowest one runs out almost to the ovary. Strip off the cilia from the epithelium of the tube, and what is left is a condition closely analogous to the uterine lining.

These hairs, as you all know, are a very delicate formation, and like the shoe of a brake, are soon worn out and are constantly being replaced. From the rapidity with which the epithelium of the cavity is regenerated after menstruation, we would naturally expect a quick repair of them when the condition which removed them is relieved. The fact that they have been found intact in parts of a tube containing a pregnancy is no argument that there had not been a desquamation in that part of the tube involved in the pregnancy. Change the nutrition of a tube by the increased vescularity of a conception, so as to cure the catarrhal condition, and the epithelium of the rest of it will be regenerated in twenty-eight days. The result of the removal of this epithelium or its hairs is the exposure of the subjacent lymph tissue and the discharge of its contents.

The only other place where this lymph is furnished is the

peritoneal cavity. Of course, it is almost an impossibility to prove a negative, and one would be foolish to say that the prolongation of lymphoid tissue which extends along the lower fimbria of the tube never reached the ovary, and may not, sometimes in an anomalous way, form a part of its bulk.

But what we do know is, that if it ever does, it must be very rare, and that we might just as well expect a rich amount of lymph from the fascia lata as to look for it from the stroma of the ovary. The peritoneum, however, we all know to be a dilated lymph-sac, and to be studded all over with little lumps of neutral tissue resembling the endometrium, just ready to respond to any governing force, and to mould itself into any required shape. So, then, from a histological standpoint, I am ready to accept all the different varieties of early ectopic gestation that are located in the utero-tubal tract or the peritoneum, but to the ovarian I am still a very decided sceptic.

I do not believe that anyone here thinks that an extra-uterine pregnancy ever occurs with a perfectly normal genital tract, and it would be an insult to the intelligence of this body to recapitulate one-tenth of what has been written about it.

My old master has so thoroughly done the majority of the work that we may consider the bulk of all cases met with in practice as settled for all time.

The little that remains for me to say in regard to any of the tubal forms is to remind you that anything, either within or without, that causes a loss of the cilia is enough to produce a spot to which the ovum may adhere. In this general statement, I mean to include all forms of strictures, internal or external, polyps, and all other new-growths, as well as all other products of inflammation or altered nutrition.

It certainly would be "carrying coals to Newcastle," for me to follow up further the life-history of a tubal gestation. So I turn at once to the discussion of that much-talked-of misplaced conception, ovarian.

From personal experience I can say nothing, for I certainly

never saw one. The specimen Dr. Mann showed us two years ago was undoubtedly a dermoid. Of these, like most of you, I have seen many. I could not have been mistaken or deluded into believing that that tough leather tissue, devoid of any sign of vascularity, could be produced by any rapid process like a pregnancy.

Nor could I think it reasonable that it had ever contained placental tissue. For you know that papillomatous formations are very common in this organ, and that it is almost an impossibility to differentiate between them and the chorial villi.

Now, do not understand me to mean an epitheliomatous papilloma, but the mucoid variety I described three years ago, and which many of you frequently see in the peritoneal cavity. What I must see, then, to convince me that there is such a thing as ovarian pregnancy, is a fully-formed fœtus surrounded by ovarian tissue.

A lithopædion cannot be trusted, for the same reason that Dr. Mann's specimen cannot, for if we admit such evidence as this it will not be long before our lists will be overrun with such masqueraders. For a calcareous fœtus is rarely perfect, and the time of placental absorption is so far past that it will be impossible to trace out a satisfactory part of the membranes, so that it will be impossible to say whether it is a foreign or a local production.

If there is such a thing as an ovarian pregnancy it must arise from some such pathological condition as that reported by Dr. Ashby, or an anomalous distribution of the lymphoid tissue in the lower fimbria as I have already described.

In Dr. Ashby's case the adhesions of the fimbria to the ovary shut in the fœtus so as to make the ovary form the outside of its cyst, while it was really being fed by the lymph from those fringes.

Now I can easily see how, that if by an unusual formation the ovum should drop into a crypt at the hilum of the ovary where there was an unusual amount of this lymph tissue, it

might be shut in by some adhesion and by its growth unfold, and so stretch out the ovarian tissue over itself, as it does the broad ligament after rupture, and thus have a large number of follicles in the wall of its sac; but to expect it to draw its nourishment from the ovary itself, is to my mind not even plausible. When, however, it lodges on one of the adenoid lumps of the peritoneum, with the conditions suitable, the ovum is not so much lost after all, and finds itself in a place closely resembling its proper home.

I believe that the spermatic fluid exercises an important influence over the future placental site, and that without it no ovum can adhere to any tissue. Like the skin graft on a granulation surface I believe it stimulates and directs into a new shape the neutral tissue of either uterus, tube, or abdomen. It is the exhaustion of this stimulus that causes the placental separation at nine months, for it has long ago been proven that like all other transient organs the placenta has its allotted time of existence.

The white blood-cell or lymph-cell of its own volition is a scavenger, and, unless restrained by some force other than its own, will at once attack all foreign substances within its reach; but as is beautifully shown in the history of sponge- and skin-grafting, when properly used, at once set themselves to the task of tissue-formation. Had Leopold made allowance for this and placed a quantity of the same spermatic fluid in the abdomens of those rabbits that fertilized those ova we hear so much about, I believe the result would have been the same as in the cases of Leclugse and Koeberlé.

It would take us too far from the discussion of our subject to follow up any further this double function of the seminal fluid. But that it is a fact, I am fully assured, and some day I hope to place the proofs before you in a thoroughly convincing form.

To recapitulate, I believe that an ectopic pregnancy may begin at any spot in the utero-tubal tract, including those crypts formed by the adhesions of the fimbria as a part of the

same, and that it may sometimes be located in the abdomen proper.

Lastly, all pregnancies that involve the ovary do so in a secondary way, and should be looked on in exactly the same way as any other organ that happens to be caught up by adhesions to an extra-uterine pregnancy.

The results and secondary changes that come to these various forms of pregnancy you have all been teaching to your class too long even to bear mention here, so we will at once pass on to the next division of our subject—its diagnosis.

Here again I must remember that I am not lecturing a class of first-course students, and will spare you the usual infliction of symptoms.

You may theorize about it as you please, but the practical question is, How often is the diagnosis made before rupture? I have said on this floor before, that I know that nearly every one of those colicky pains means a giving way of some part of the tube. Sometimes the first one gets a large bloodvessel, but more generally the bleeding is not alarming until the second or third.

With these pains once begun the patient comes to see her doctor and then most anybody can suspect the condition, but no one can be certain until the abdomen is opened. Then, if your guess is the proper one it is very easy to say, I told you so; and if it is not, with equal facility the case is labelled "exploratory incision" and passed on. The whole matter in a nutshell is, that before rupture there are very few patients that will be bothered with a doctor; and after that, thanks again to Mr. Tait, there are very few practitioners who cannot give a shrewd guess as to what is the matter. Once discovered or suspected, in my mind all that is left is to remove it, or be sure that it does not exist, and the only way to do this is with an exploratory cut.

The pros and cons of the electric treatment are old stories to you all. Its being based on the assumption of the death

of the child ending the matter, to me condemns the whole process. For I know well that the placenta has a separate existence, and that it must be killed before the growth of the gestation-sac can be arrested.

Errors in diagnosis which must undoubtedly make us sometimes roughly handle diseased organs that should be let alone or removed, form another strong objection to its free application.

Furthermore, when we have diagnosed it correctly, and safely to the mother destroyed both fœtus and placenta, we have done little more for the future of the mother than if we had found her with a broad ligament cyst and done nothing more than tapped it. We have not only left her to the dangers of suppuration of the present pregnancy, but to the risks of a repetition of all in the future.

What I have said about the electric treatment before I now most unconditionally repeat, and that is, it is dangerous in practice, wrong in principle, and disastrous in its final results. It seems to me, gentlemen, that the time is not far off when it will be thought of merely as one of the mistakes in the management of extra-uterine pregnancy, and like tapping ovarian tumors, it will be one of the curios of the past.

DIAGNOSIS AND TREATMENT OF EARLY ECTOPIC GESTATION.

By J. M. Baldy, M.D.,
Philadelphia.

In following me into a discussion of this subject, I wish it to be distinctly borne in mind that what I have to say is applied to this disease only in its earliest stages, namely, at that period when the rupture is liable to take place from the tube into the broad ligament or into the abdominal cavity, as well as at the period immediately following the rupture.

It would seem from this that I accept the views of Mr. Tait as to the pathology of extra-uterine pregnancy; with a few reservations this is a fact. My whole line of argument will be based on the premises that the conception has taken place in one or other of the Fallopian tubes, or has subsequently found its way there and has there developed. I do not wish to be understood as denying that there is such a condition as ovarian or abdominal pregnancy, but for our present purpose we may safely ignore that phase of the question altogether, because at the early stages of the disease with which we are dealing, the three conditions could hardly be differentiated. It is most certain that an overwhelming majority of the cases are tubal in their incipiency, and whether an occasional one prove to be either of the other two varieties, it cannot make the slightest difference from a diagnostic and therapeutical point of view. In this discussion I propose to ignore, to a great extent, the ancient literature of the subject. Of whatever value this has proven in times

past in establishing the pathology of extra-uterine pregnancy, it is to-day of far less value from the point of view of this paper than the experience and literature of the past few years. I infinitely prefer the testimony of men who have made their observations with a pretty clear idea of the pathology and frequency of this and allied diseases, to that of men who were groping in the dark with little or no idea of this trouble or of the many diseases with which it may be, and has been, confounded. With the recent data, then, to supplement my own personal experience of more than twenty cases of early ectopic gestation I shall be satisfied to draw my conclusions.

The symptoms of this disease have been variously classified, and it is claimed that if a certain number of them be grouped together in the same patient, the presence of the abnormal gestation is assured. In considering these symptoms we will take them as nearly as may be in the order of their importance.

Menstruation.—This may be absent for one or two periods, and then a spurious flow may appear which is at first lighter and finally darker in color than normal. It is irregular, prolonged, and contains, after a while, clots and shreds. There may be no missed period at all—simply a prolongation of the normal flow, with the above characteristics. I have had patients pass under my hands in whom this spurious menstruation did not appear at all; in whom there was not even a scanty or prolonged flux. To a great extent this depends on the period at which the patient is seen; the earlier, the less likelihood of irregularities. Oftentimes the patient has a history of similar irregularities, and one is very apt to be misled by this.

Pain.—This pain is of a somewhat different character from other pains to which women are liable. Early in the growth of the gestation-sac it is slight, occurring at long intervals, and as a rule not much notice is taken of it. Oftentimes it disappears altogether for a few weeks, and would be

forgotten but for its reappearance in redoubled force. It is intermittent in character, cramp-like, becoming more and more severe and more and more frequent. It at times becomes so severe as to cause syncope. Its situation is almost invariably pelvic and low down in the abdomen. It can be safely said that this symptom is invariably present. As a rule, it is the one thing which forces the patient to seek the advice of her physician. Of all the individual symptoms this one has proven of most value to me in recognizing the true condition. This almost characteristic behavior of the pains taken in conjunction with the appearance of the menstrual discharges when they are abnormal, should always put one on his guard and force him at least to weigh carefully all the pros and cons before dismissing the possibility of ectopic gestation.

Expulsion of Decidua.—This may be thrown off in the shape of shreds and mixed with clots of blood, or (which is more usual), after a few days' discharge of shreds, may come away in one good-sized mass. This symptom is theoretically of the utmost value, and when it is demonstrated is conclusive (of pregnancy). Practically, its value is in the majority of cases lost. As a rule, we must depend on the statements of the patient in regard to the matter, and these statements are often worthless. I find that they do not observe closely enough, or are so ignorant as not to be able to distinguish between blood-clot and other material. Again, the decidua is oftentimes lost in the water-closet or in a vessel full of clots. I have had women declare they were discharging shreds, when a careful examination failed to reveal a sign of one, and *vice versâ*. Taking it all in all, I do not attach much value to this sign practically—realizing, however, its great importance when it can be properly demonstrated. Where it is absent altogether is mostly in the early weeks of the disease.

General Signs of Pregnancy.—As a rule, these are the reflex—gastric and breast—symptoms of normal pregnancy,

as well as the bladder and rectal disturbances of the same condition. These same symptoms may be present in women who are not pregnant at all. They may arise from almost any cause of irritation to the genital canal, and are frequently present in such diseases as ovarian cyst, pyosalpinx, etc. Standing alone they are worthless for determining pregnancy, especially the extra-uterine variety.

Period of Sterility.—As a rule, the patient has had a child or miscarriage some years ago, with a history of sterility since that date. This is not always so, however, as some women conceive with the fœtus extra-uterine as soon after the first pregnancy as the law will allow.

Vaginal Discoloration.—This, for the most part, is the usual discoloration of pregnancy.

Cervix.—The cervix is enlarged and soft, and the os is patulous. I have noticed an absence of these symptoms in several cases and they cannot be considered as at all constant.

Body of Uterus.—The fundus is enlarged and softened, and mostly crowded either far forward against the pubic bone or is pushed to one or the other side. It is immovable and has a feeling of softness. Like the cervix, however, these conditions are not constant. I have studied patients for several weeks at a time, in whom the uterus was normal in every particular, trying to arrive at a diagnosis, yet ectopic gestation was finally proved to be present.

Uterine Appendages.—At times an examination of one side is perfectly negative, while on the opposite side a tense, adherent, tender cyst is present. This cyst I have found in several cases almost in the median line, posterior and apparently so continuous with the cervix as to make it impossible to find any dividing-line between them. In one case the fundus was so high and so far back as to seem part of the cyst. On the other hand, cystic masses (apparently characteristic) will be found on both sides, one proving to be an ovarian cyst, an ovarian abscess, a pyosalpinx, or a dermoid cyst, the other being demonstrated to be a tubal pregnancy.

All these conditions I have seen and studied with the specimens in my hands. The local condition is so varied and deceptive that only corroborative evidence can be obtained from it. The ectopic gestation-cyst, if kept under observation, increases very perceptibly in size from time to time, but it is exceedingly dangerous to wait and watch for this symptom.

The Pulsation of the Cyst.—I have studied the disease from this point of view and in spite of what others have had to say as to its importance I have been unable to find the slightest thing characteristic about it. The pulsation is present in so many pelvic conditions, especially in distended Fallopian tubes, that I have found it worthless as a reliable point in this disease. In proved cases of ectopic gestation it has been present in some and absent in others in my experience.

Ballottement.—I have never been able to observe this symptom in any case, nor have I seen a specimen under the third month in which I think it could have been demonstrated. The number of cases in which it is claimed that it has been observed is small, and to me it is of very doubtful value as a diagnostic aid.

The Patient Considers Herself Pregnant.—I have found in the majority of cases that the women did not think they were pregnant, or at least were very uncertain what to think when questioned on this point. Only two or three times did my patients state positively that they thought themselves in the "family way". We all know how often women think themselves so when they are not. I do think this point of much value one way or the other.

Temperature and Pulse.—A number of times I have noticed a persistent and considerable rise in temperature and pulse, and the patients have at times complained of feeling chilly. The exacerbation of temperature is due, no doubt, to the local pelvic inflammation which so often accompanies this disease and which causes the adhesions so frequently met with.

When we come to the period of rupture, symptoms of great

pain followed by collapse and all the signs of concealed hemorrhage make the presumptive diagnosis comparatively easy, especially when taken in conjunction with the past history.

It would be natural to suppose that where the combination of a number of these symptoms presented themselves in the same patient a diagnosis of extra-uterine pregnancy could readily be arrived at; such is the belief of some of the profession. Reeve[1] states that, "in a patient presumably pregnant, having had more than one such attack as this [he refers to the paroxysmal pains], and having a tumor to be felt *per vaginam*, there could scarcely be a doubt of the existence of extra-uterine pregnancy." My own experience has taught me the fallacy of this, and I am coming more and more to regard my position as taken in the *Medical Record*, September 21, 1889, as the true one. In that paper I stated three propositions:

1. In a certain proportion of cases of extra-uterine pregnancy, in the early stages, the diagnosis is easy and unmistakable.

2. In a certain (quite large) proportion of cases sufficient symptoms are present more than to warrant a diagnosis of extra-uterine pregnancy, such a pregnancy not being present.

3. In a certain other proportion of cases the symptoms, until rupture has occurred, are entirely wanting or of such dubious character as in nowise to warrant such a diagnosis.

The following history is that of a patient who came under my observation:

Mrs. X., aged twenty-six years; married seven years. One child six years ago; had puerperal trouble after confinement, never pregnant since. Two and a half months ago she missed her menstrual period and soon began to develop symptoms which made her think that she was pregnant. In the course of about six or seven weeks she began to have a bloody vaginal discharge, which finally contained shreds and clots. About this time pains which had been present in slight degree became severe and paroxysmal. On account of the bleeding and pain she applied to me for

[1] American Journal of the Medical Sciences, July, 1889.

advice. On close questioning she acknowledged having passed a mass, but was doubtful whether it was blood-clot or not. A vaginal examination revealed a softened cervix, a slightly-enlarged uterus with a tense, adherent, tender cyst on the right side, the uterus being crowded to the left. A diagnosis of tubal pregnancy was made and the gestation-sac was removed two days afterward.

This case presents a line of symptoms which apparently could lead to but one conclusion, and so the event proved. But contrast this case with the two following which occurred in my practice :[1]

Mrs. X.; general and reflex symptoms of pregnancy, such as swollen and painful breasts, containing milk; morning nausea; enlarged abdomen; frequent micturition; constipation, etc.; had missed a period or two. Patient thought herself pregnant; had not been pregnant for some years; irregular bleeding for a week or two; colicky pains in the abdomen; passage of blood and shreds *per vaginam*. Examination showed cystic tumor to one side of the uterus painful to the touch. The patient was seen by Dr. J. Price and several other gentlemen, all concurring with me in the diagnosis of undoubted extra-uterine pregnancy. Several days afterward an operation disclosed an ovarian cyst as large as an orange.

Mrs. Z.; general and reflex signs of pregnancy almost as above; not pregnant for years; missed a period; profuse bleeding with clots and shreds; severe pelvic pains of a colicky character. Examination disclosed a pelvic mass at the side of the uterus, evidently a distended tube. A diagnosis of extra-uterine pregnancy was made by Dr. Kynette, several other gentlemen and myself. Operation in a few days by Dr. Penrose disclosed pyosalpinx.

The following cases simply emphasize what my own cases prove :

Mrs. D.,[2] a patient of Dr. Weeks, of Trenton, married four years; never pregnant; menses always regular and not pain-

[1] Medical Record, Sept. 21, 1889. [2] Annals of Gynecology, May, 1890.

ful. One week after her January period she noticed a dull pain in the lower part of the abdomen, followed in another week with sick stomach, and all the symptoms of pregnancy. Her menses absent for six weeks, when she was suddenly seized with severe pain and began to flow. The woman finally took to her bed. The discharges were lochial in character, and contained shreds; this was seen by both doctor and nurse. A tender cystic mass was found to the left and posterior to the uterus; the fundus was crowded forward and to the side. A diagnosis of extra-uterine pregnancy was arrived at, and I was asked to see the patient. I found everything as narrated, and verified the diagnosis. Two days later a laparotomy disclosed a large pelvic (intra-peritoneal) abscess. The Fallopian tubes and ovaries showed no signs of having been impregnated.

Mrs. K.,[1] a patient of Dr. B. C. Hirst, æt. twenty-five; last child two years ago; menses absent two periods, but had returned some time before being seen by doctor; history of discharge of clots and membrane; great pain in pelvis and abdomen. Examination showed uterus enlarged, os patulous, uterus displaced to right side; tumor in left broad ligament as big as an egg. Extra-uterine pregnancy was diagnosed. At the operation which followed a broad ligament cyst was removed. The woman afterward passed remnants of an abortion.

Dr. Joseph Price,[2] in a patient sent him by Dr. Garret, of Germantown, found a mass on the left side of the pelvis as large as a three months' uterus, with the history that the woman had been married ten months; that the menses ceased three months after marriage, and she had all the symptoms of pregnancy. There was absence of two periods followed by hemorrhage and pain. Extra-uterine pregnancy was diagnosed. Laparotomy revealed a small suppurating cyst of the right ovary with an adherent hydrosalpinx.

Dr. H. C. Coe[3] reports the case of a woman whom he saw in consultation. She had missed two menstrual periods and

[1] Personal communication.

[2] Annals of Gynecology, March, 1890.

[3] American Journal of Obstetrics, January, 1890.

presented the subjective symptoms of pregnancy. One day she had an attack of violent pain in the abdomen with evidences of collapse. A mass was found on the right side of the uterus which seemed to grow week by week. She had a bloody discharge from the vagina. A sound was passed into the enlarged uterus a number of times, and both the galvanic and faradic currents were applied. The uterus was enlarged, the cervix soft, and the os patulous. The tumor was fixed and fluctuating. Finally, she had another attack of pain with apparent collapse. Extra-uterine pregnancy was diagnosed. Laparotomy revealed a normally-pregnant uterus with a large adherent ovary on the right side.

Dr. G. W. Johnston[1] met with a patient, æt. twenty-two. Shortly after the cessation of a monthly period she began to suffer from nausea, frequent micturition, and colicky abdominal and pelvic pains; her breasts were tender, the uterus enlarged and anteposed; on the right side of the uterus and posterior was a round, exquisitely tender, semi-fluctuating tumor as large as a lemon. The attacks of pain were paroxysmal and on several occasions the patient was almost collapsed. She had a vaginal discharge which contained shreds. Extra-uterine pregnancy was diagnosed. Laparotomy revealed a tubo-ovarian cyst as large as a lemon.

Gill Wylie[2] says he has operated on three cases in which the diagnosis of extra-uterine pregnancy had been made, in two of which a supposed cure by electricity had been recorded, and at the operation no sign could be found of ectopic gestation having existed. The cases were simply those of tubes dilated with fluid; one tube containing more than two pints of fluid.

An article by Vander Veer[3] discloses two cases (Mundé's and Janvrin's) of pregnancy in one horn of a bicornate uterus

[1] American Journal of Obstetrics, August, 1889.
[2] Ibid., January, 1890, p. 71.
[3] Ibid., November, 1889.

mistaken for ectopic gestation. He also reports two cases (Warren's and Vander Veer's) of normal pregnancy so mistaken.

It certainly is unnecessary to reproduce more evidence than this in order to convince the most sceptical that the symptoms of extra-uterine pregnancy are very often present, and that the disease is anything but an ectopic gestation. I am ready to grant that all the symptoms which we have considered as being produced by this disease were not present in each and every one of the cases presented; but in what disease in the whole range of medicine are all the symptoms of that disease reproduced in one and the same patient? The most prominent and valuable points are noted in each case, viz., the subjective signs of pregnancy, the pains, the missed menstrual period, and the bloody vaginal discharge containing shreds or masses, together with the cystic tumor in the region of the broad ligament. A study of these cases will show most decidedly that no other conclusion could have been arrived at in any single case, and in addition, the names of the attendant physicians are a sufficient guarantee that the symptoms and history were carefully weighed. There are many more such cases on record, and very many which are not but should be.

It is interesting in this connection to note the wide range of diseases which have been mistaken for ectopic gestation in its early stages. Dr. T. Gaillard Thomas says, "There are few pelvic conditions which develop in the female, from phantom tumor to fecal impaction, which I have not seen confounded with ectopic gestation." Amongst the few cases I have reproduced in this paper the mistake was made in the case of ovarian cyst, pyosalpinx, pelvic abscess, broad-ligament cyst, ovarian abscess, normal pregnancy, pregnancy in one horn of a bicornate uterus, and tubo-ovarian cyst. This only covers a portion of the diseases which may be so mistaken. If the mistake is to be made in one class of cases more than in another, I believe it will be in patients in whom an abortion has taken place and a pelvic tumor (a pelvic

abscess or pyosalpinx) follows, or in whom a pelvic mass existed formerly and was unknown, and where the facts of the abortion are unknown or concealed. The case of Dr. Weeks, as quoted above, was such a one.

Now, with all these chances of mistake in diagnosis, have we yet run the gauntlet and have we considered all the possible errors? By no means. We still have to consider those cases where extra-uterine pregnancy is in actual existence, but where a failure to suspect it has occurred, or where it has been taken into consideration but has been dismissed for lack of sufficient evidence. The following two cases which occurred in my own practice illustrate this point very well:

Mrs. R.[1] came to me complaining of abdominal and pelvic pain. After giving a negative history she was put on the table and a diagnosis of pyosalpinx was made, and an operation advised. One week later she sent for me and I found her lying on her bed. She said she had been having abdominal pains all week. She arose from the bed in order to obtain a letter. While on her feet she was seized with a colicky pain. As I watched her the idea suddenly seized me that possibly this might be extra-uterine pregnancy. I carefully examined her with this possibility in view. She had been bleeding, off and on, for more than two weeks; the show was clear blood, with not a shred or clot in it; she had not the slightest general or reflex signs of pregnancy; her husband had been away for only three weeks; she had not missed a period nor had she had a scant one; she had been bearing children for the past six or eight years at regular intervals. The examination showed the uterus in good position, and the cervix perfectly normal for a multipara. There was a mass posterior and apparently continuous with the cervix; so much so, that had I not been able clearly to feel the fundus anteriorly, I should have thought it the fundus. The only symptoms I had then for diagnosis were the bleeding and the pain. These symptoms are such constant and almost invariable companions of all serious pelvic troubles, that without something more to sustain the diagnosis it had manifestly to be given up.

[1] New York Medical Record, September 21, 1889.

Dr. R. H. Hamill made a most careful examination for me and could find nothing more than I had on which to base a diagnosis; in fact, he did not think it a case of ectopic gestation at all. Our preference for the diagnosis of pyosalpinx was because of the negative symptoms for extra-uterine pregnancy, and because the woman had been complaining of pelvic pains for the past three or four years, had pain at her menses, and painful coition and defecation. She had been having more or less whites and they had suddenly become profuse, with itching about the vulva and painful micturition. She was in that state of life when one would expect her husband almost certainly to infect her with gonorrhœa. She had a high temperature and pulse, and chilly sensations. Taking it all in all, the indications were clearly for pelvic inflammatory trouble and against extra-uterine pregnancy. It turned out to be a pregnancy of the fimbriated end of the tube.

Mrs. T. C.,[1] æt. twenty-four, married nine years. Has had two children and no miscarriages. The last pregnancy was six or seven years ago. After this labor she was in bed for eight weeks with a "sore and swollen belly," and since then she has never been free from pelvic and abdominal pain. Her menstruation has been regular but profuse, lasting eight or nine days. In the interim between her first illness (following the birth of her child) and the present, she had an attack of abdominal pain, which confined her to bed for a week or more. On November 15, 1889, she came to me stating that her regular menstruation period had come on five weeks previously and that she had been bleeding more or less ever since; the constant pain she had been having had become worse. She had the appearance of a very sick woman, her temperature was elevated, her pulse quick, and she was having chills and creeping sensations. An examination of the pelvis showed the uterus in fair position and of normal size. There were irregular cystic masses on each side, the largest being on the right. A diagnosis of chronic double pyosalpinx with an acute attack of pelvic peritonitis was made and an operation advised. I removed from the right side a tubal pregnancy (verified by microscopic examination) which had advanced to

[1] The Medical News, February 15, 1890.

about the sixth or seventh week; from the left side an ovarian cyst the size of a hen's egg. The results of the operation were a complete surprise to me. My diagnosis of pyosalpinx, which was concurred in by Dr. T. Hewson Bradford, was made with the utmost confidence and we had not the slightest doubt that it would prove to be correct. An ectopic gestation never entered into consideration. As soon as the patient was well enough I questioned her closely to see wherein we were at fault in our deductions. A most careful questioning disclosed the following facts: At no time during the past year had she missed a menstrual period, nor had there been a scant or delayed one; at no time had she had any signs of pregnancy, such as she suffered from when she was previously impregnated. In fact she does not even now believe that she was pregnant, basing this scepticism on the absence of a missed period and the early signs of pregnancy. Her breasts were of normal size, the areolæ were not enlarged or changed in color; there was no tingling or itching about the breasts, though they contained a small quantity of milk—however, she states that such had been their condition since the birth of her last child. There was no decidual discharge; the only thing she passed besides blood, was "a piece of whitish matter," such as she was in the habit of passing at the end of each menstrual period. This point has been most carefully inquired into, and she answers very intelligently. In addition to her statements we have those of a carefully-trained nurse. The patient was in the hospital for two or three days before the operation, bleeding constantly. The nurse declares that the napkins were soiled with a discharge entirely free from clots or shreds. Stomach symptoms were entirely wanting. The pains were, according to her statement, not different from those she had with her previous attack of probable pelvic peritonitis.

In addition to these cases of my own, I will emphasize my position by reference to a few others occurring in competent and skilled hands.

G. M. Tuttle[1] reports the case of a woman who was under observation for several months. A diagnosis of double pyo-

[1] American Journal of Obstetrics, January, 1890.

salpinx was made. The operation revealed a pyosalpinx on the left side, with a tubal pregnancy on the right side.

H. T. Hanks[1] records a case on whom he operated. The physician who sent him the patient said that she had very little suffering and advised that no treatment be instituted. After reaching New York, however, she began to suffer and a diagnosis of pyosalpinx was made. At the operation which followed, a tubal pregnancy was removed.

J. P. Tuttle[2] records a very interesting case. After carefully studying all the symptoms, he discussed the case at length with an experienced physician in New York, and after weighing the evidence pro and con they decided against ectopic gestation. The fœtus was afterward delivered from the rectum.

E. W. Cushing[3] mentions a case which had been operated on for an ill-defined tumor. The cyst was opened after the operation and a fœtus was found. There had not been a suspicion of pregnancy.

Smith[4] reports a case in which the patient died, and a post-mortem examination showed the right Fallopian tube distended into a sac containing a three months' embryo and placenta; the sac had ruptured, causing the death. He says, "in this case extra-uterine pregnancy was not suspected until I received the history of the symptoms immediately preceding death, nor can I see anything after reviewing the case, which would have justified the diagnosis of tubal gestation. There was no attempt at abortion, no hemorrhage, no pain referable to the uterus or tubes."

William T. Lusk[5] has recently operated on two patients and found extra-uterine pregnancy, in either of whom under ordinary circumstances it would have been impossible to

[1] American Journal of Obstetrics, January, 1890.
[2] Annals of Gynecology, February, 1889.
[3] Ibid., November, 1889, p. 87.
[4] American Journal of Obstetrics, March, 1889, p. 259.
[5] Journal of American Medical Association, April 12, 1890.

make a diagnosis. He has in the last few years changed his views very considerably on this subject, and he now believes that the number of cases in which we can diagnosticate extra-uterine pregnancy in advance is really very small.

Joseph Price in a recent discussion before the Philadelphia Obstetrical Society, stated that he had failed to make a diagnosis in four out of the last five cases of ectopic gestation he had operated on.

I could go on quoting many more, but I have already produced sufficient for my purpose.

It is here interesting to note the mixed character of the trouble in a number of the cases. My second case was complicated by an ovarian cyst on the opposite side. The case of G. M. Tuttle had a pyosalpinx on the opposite side. Cases have been reported where there was an ovarian cyst on the same side. The literature is full of this mixed condition.

The class of cases we have been considering forms no mean proportion of the total number of cases of ectopic gestation on record, and in all human probability the vast majority of such cases are unrecorded. To give some idea of the immense proportion of mistakes which have been made in diagnosis during even the past few years, let us compare some approximate figures. It would be fair to assume that the total number of cases of extra-uterine pregnancy in its early stages which have been put on record during this period, does not, in the United States, much exceed two hundred, if it reaches this point. At the end of 1888, Hanks[1] tells us that there had been in the past three years a total of 97 cases of extra-uterine pregnancies of all stages, reported in all the journals published in the English language. It is also fair to assume that there are very few cases in this time which have been diagnosed, which have not been recorded. Add fifty cases to cover this possible discrepancy and we have an approximate total of two hundred and fifty cases diagnosed during this period of time.

[1] Transactions American Gynecological Society, 1888, p. 360.

Now compare these figures with those of the other side of the story. With merely a superficial glance over only a part of the literature, I have found some twenty cases recorded (a few of which I have quoted above). It must be remembered that this does not by any means represent all the mistakes which have occurred, as men will conceal their blunders in spite of anything which can be said. In addition to these, which in themselves form a formidable percentage of the total number diagnosed (20 as against 250 or 12½ per cent.), I have the word of the coroner's physician of Philadelphia, Dr. H. F. Formad (and have myself seen and studied many of the specimens), that he has in his possession the specimens from more than thirty women who died from rupture of an ectopic gestation-sac. These cases had been under the care of one or more physicians prior to their deaths, and yet none of these had been diagnosed, and a post-mortem examination by the coroner's physician was necessary in order to ascertain the cause of death, it being supposed in the case of many of them that they had been the victims of foul play. No reasonable man will contend that such cases occur only in Philadelphia, and if we make a calculation on our fifty or more millions of population we would have an approximate total in the United States during the past few years of about 1500 deaths from undiagnosed extra-uterine pregnancy. Of course these figures are only approximate, and it would take a great deal of time to verify them. However they are sufficiently accurate to give a thinking man plenty to reflect upon, and must carry conviction to the minds of most. Now in addition take into consideration all those cases where the disease has existed but has been overlooked, and those again in which the diagnosis has been made and the disease has not existed, and our chances for a correct diagnosis fade to a minimum. I do not wish to be understood as thinking that it is impossible ever to make a correct diagnosis in the early stages of extra-uterine pregnancy, because it has been accurately made, and I have made it myself, and verified the correctness of my diagnosis; the

impression I would wish to create is that in the great majority of cases the diagnosis can only be an approximate one, and when it is once made we are oftener likely to find ourselves mistaken than not. I think the evidence here produced more than sufficient to uphold that opinion.

Of the total number of cases of extra-uterine pregnancy which come into existence from time to time there can be no doubt whatever that a certain number go on to a spontaneous cure. I believe far more terminate in this manner than we at present imagine. The most common *modus operandi* is a rupture into the folds of the broad ligament, the death of the embryo, and a gradual complete or partial absorption of the resulting hæmatocele, embryo, and membranes. That the death of the embryo is possible before rupture, and while it yet remains in the tube is, I think, not only possible, but probable, in a certain proportion of cases. The result in such a case would be the same as in the former. Just what proportion of cases end in this happy manner is merely a matter of speculation. These results would naturally make us take into consideration, as one of the methods of treatment, the expectant plan. Theoretically, this is so, but, practically, I know of no authority bold enough to advocate it. Such a large number of cases terminate fatally, and the gauntlet of dangers is so great to the patient that, at the present time, it is thought necessary to take some active steps in treating every case which comes under observation, and not to take any chances of disaster overtaking the patient. This course seems to me to be the only reasonable one, and where a case is even only suspicious active measures of one kind or another should be taken to prevent possible disaster. In considering the treatment of extra-uterine pregnancy I shall confine myself to the period before rupture. Everyone is agreed that after rupture of an ectopic gestation-cyst has taken place, there is but one proper treatment, viz., abdominal section. In the discussion of the relative merits of laparotomy and electricity it has too often been assumed by the

opponents of the electrical treatment that this treatment is recommended for the post-rupture period. This is not true; no one whose word carries the slightest weight recommends the use of electricity after a rupture has taken place into the abdominal cavity, nor after a rupture into the folds of the broad ligament, beyond a certain period, the limit being generally fixed at or under four months; later than this, even electricians recommend either waiting for a viable child and then laparotomy, or laparotomy at once. There are but two forms of treatment which I shall consider, viz., laparotomy and electricity. All operative procedures from the vagina (unless in very exceptional cases) are unscientific and bungling; the sac cannot be removed without the greatest difficulty (if it can be removed at all), and the removal of the whole sac is a great desideratum. Puncture, with the object of drawing off the liquor amnii and killing the fœtus, has, in times past, proved so disastrous, that I do not think, with our present safe methods of dealing with the disease anyone would knowingly attempt it; certainly not here in America. The injection of morphine into the sac, as practised by Winckel and others in Germany, has not proven a success even in their hands. In Winckel's *Text-book of Midwifery*, translated by Edgar, eleven cases are mentioned as having been treated in this manner. Of the eleven, three were fatal, a mortality of almost twenty-five per cent. The merest tyro could not reproduce such a disastrous record with either electricity or surgery.

The only method of application of electricity which will be included in the subsequent remarks will be where either a faradic or galvanic current is passed through the gestation-sac without there being any puncture made. Certain writers (especially foreigners) have persistently and, it would almost appear, wilfully misunderstood Americans when they talk of the use of electricity in this disease. The advocates of this method of treatment have always and most emphatically claimed that they did not puncture and that it was dangerous

to do so. In the face of all that has been said on this subject, it is simply gross ignorance (or worse) longer to misunderstand and misquote. The contention, then, is between laparotomy and electricity applied after the most approved fashion. I make no distinction between the faradic and galvanic currents; both are used, both are recommended with equal fervor, and apparently have about the same result.

The advantages of the treatment of extra-uterine pregnancy in its pre-rupture stages by laparotomy may be summed up as follows:

1. By the operation the fœtus, membranes, and sac are completely removed.

2. Any complicating disease which may exist can be successfully dealt with at one and the same time.

3. All immediate danger from the existence of the abnormal gestation is at once and forever removed.

4. All remote and possible future trouble from the occluded tube is removed.

5. In cases of mistaken diagnosis, whatever may be found will require surgical intervention and therefore the mistake is productive only of good.

6. The operation has very little, if any, mortality, and is safe in the hands of anyone who can do any laparotomy with safety.

The disadvantages claimed for the operation by its opponents are:

1. Dangers of the operation itself.

2. Unsexing and mutilation of the patient.

3. The possibility of mistakes in diagnosis and the consequent unnecessary operation.

4. The patient's horror of an operation.

The advantages of the electrical treatment as claimed by its advocates are:

1. The certainty of killing the fœtus.

2. The probability of the absorption of the sac contents and the subsequent shrinkage of the tube to a natural size.

3. When the sac contents are not absorbed, the harmlessness of the remaining tumor.

4. The possible future impregnation of the patient.

5. The avoidance for the patient and friends of the horrors of the operation.

6. The harmlessness of the treatment if a mistake in diagnosis be made.

The disadvantages claimed for the electrical treatment by its opponents are :

1. The uncertainly of killing the fœtus.

2. The danger of delay necessarily incident to the treatment.

3. The dangers during the treatment.

4. The harm done in case of mistaken diagnosis.

5. The dangers to the patient after the treatment is finished.

6. The doubtful nature of the disease in many of the cases treated in this manner.

First, as to the treatment by laparotomy. The points of advantage, as claimed by its advocates and as given above, make it an ideal treatment in its results, provided those claims can be substantiated. Several of these claims are questioned by its opponents, and we will consider them *seriatim*.

1. It is claimed that laparotomy is a dangerous operation at all times and under all circumstances. This must theoretically be granted at once, but when practically applied to extra-uterine pregnancy it cannot be shown to have existed in the past few years, unless it be in the hands of incompetent men. I am unable to find in the literature of the subject a single case of death following the operation in its prerupture stages ; and even after rupture there are no deaths which can be justly attributed to the operation—in almost every instance of death the patient has been beyond help in consequence of hemorrhage or shock or both. On the other hand, look at the long list of brilliant results as reported in the New York and Philadelphia Obstetrical Societies, to say nothing of Tait's

individual list of forty-two cases. In the face of this overwhelming evidence, in order to substantiate this point of danger, a list of bad results must be produced; as yet no one has had the temerity to attempt this.

2. The unsexing and mutilation of the patient. In no other part of the body is it considered a mutilation to remove a useless, diseased, and dangerous member. This cry is merely the plea of the demagogue, and savors of a species of political trickery unworthy of a respectable scientist The patient is not mutilated and it is rank nonsense to say she is. She certainly is unsexed, in the sense that she cannot become again impregnated from that same side; that she is unsexed in any other sense of the word is untrue. But it must be remembered that almost always the disease is unilateral, and the opposite side remains undisturbed and in good condition for performing its natural functions. The case of Tait's[1] which became a second time impregnated after the removal of a unilateral ectopic gestation proves the truth of this. But it is said that double tubal pregnancy exists at times! This is true and in that case sterility would be complete. It has never been proved in a single case that the woman is not just as sterile after a cure by electricity, or even after a spontaneous cure, as she is after the operation. A patient or two may have become pregnant after such treatment, but how can it be proved that the impregnation did not take place from the opposite side, as was the case in Tait's patient as well as in the case of several others on whom the operation was performed? Both theoretically and practically the facts are all against the electricians, and they must either prove their point or abandon it.

3. The possibility of a mistaken diagnosis and the consequent unnecessary operation. In competent hands, even though a mistake in diagnosis be made, the operation will not have been unnecessary. There is no pelvic tumor which

[1] Diseases of Women and Abdominal Surgery, 1889.

exists, and which gives rise to sufficient serious symptoms to cause a diagnosis of ectopic gestation, which will not require treatment, and the most generally accepted treatment for all these diseases is laparotomy and removal.

4. The horrors of the operation to a patient and her friends. This is incident to all operations, great or small, and cannot to a certain extent be avoided, however much it is to be deplored. I have never found a great amount of trouble on this score. When I have explained to the patient and her friends the supposed nature of her complaint and pointed out its dangers they have generally been anxious for the operation and did not display half as much anxiety over it as they did over the disease. Electricity itself is not altogether free from this same objection so far as the patient is concerned. It is merely necessary, as a rule, to tell women that something has to be done, to frighten them; they are not much given to discriminating between degrees of danger in operations. An operation is an operation, as a rule, to a patient, be it laparotomy, cutting off a toe, or applying electricity to kill something, although it must be admitted, as a general thing, women would object to electricity the least if the choice were given them.

It would seem, then, that the claims of the advantages of the surgical operation are well established, and in the operation we have an ideal treatment. Here we could rest well content did not the advocates of the electrical treatment claim equal advantages for it. If these advantages as claimed and given above can be substantiated, it must be admitted that it is equally ideal with the surgical procedure, and the patient must in each case be given her choice, after the advantages of each have been impartially placed before her. In such an event, that she would in the majority of cases choose the electrical treatment, is pretty certain.

To these supposed advantages of electricity certain objections are made by its opponents, and, as in the case of the surgical treatment, we will consider these objections *seriatim*.

1. The uncertainty of killing the fœtus.

Coe[1] reports the case of a woman who was supposed to be suffering from extra-uterine pregnancy. Her doctor, who was a careful practitioner, used first the strong galvanic and then the faradic current with the view of destroying the fœtus. As a result of the application the patient had severe uterine colic and more or less shock. After this treatment had continued for two weeks, she had an attack of abdominal pain more severe than before. Coe saw her at this time. During the following week she was reported as growing worse and worse, had become very feeble, and her physician feared that peritonitis was developing. Finally she had another attack of pain with apparent collapse, and an exploratory incision was made, only to find a normal pregnancy of three months. The patient recovered from the operation and aborted later. Here not only was an extra-uterine pregnancy supposed to be present where there was none, but the electricity failed to kill the fœtus.

Buckmaster[2] reports the case of a patient who had fibroid tumors of the uterus and who became normally pregnant. Not being aware of the pregnancy, at the third month of gestation, he put the woman under chloroform and passed twenty milliampères of a galvanic current for twenty minutes; in spite of this the patient went on to term and was delivered of a living child.

Bovee[3] reports the case of a patient who had formerly been a patient of Chadwick, of Boston. Chadwick had diagnosed the case in the ninth week and applied electricity in the eleventh week, killing the fœtus (so he thought). At the end of five months, Bovee delivered a five months' fetus from the vagina. It was pronounced a five months' fœtus by Billings and in Lamb Washington, and later by Minot in Boston, who considered the pregnancy advanced one hundred and

[1] American Journal of Obstetrics, January, 1890, p. 95.
[2] Ibid., January, 1890, p. 74.
[3] Annals of Gynecology, July, 1890, p. 538.

fifty-three days, and could not reconcile this with the fact of the fœtus being destroyed by electricity in the eleventh week.

Wylie[1] records a case where electricity had been used under ether several times and yet the fœtus lived. It was finally killed by injections of morphine and as a result of the morphine treatment the contents of the sac underwent suppuration and the patient lost her life, an operation failing to save her.

I could go on giving a number of other failures to kill the fœtus, but will trouble the Society with but one more. The case has not yet been published, but full details will soon be given the profession. The woman was a patient of Dr. Morris Lewis, of Philadelphia. She was seen in consultation by Dr. B. C. Hirst and extra-uterine pregnancy diagnosed. Dr. G. Betton Massey was called in to apply electricity for the destruction of the fœtus. Six treatments were given, the galvanic and faradic currents being used on alternate days. More than one hundred milliampères of the galvanic current and the full force of the faradic current were given at each of the respective sittings. The three attendants then agreed that if the fœtus was not dead they could not kill it. The woman went on from bad to worse, and a month afterward Dr. C. B. Penrose removed a growing tubal pregnancy.

Further comment on this point is unnecessary. It is simply folly to insist that electricity is sure death to the fœtus in the face of this and other evidence.

2. The dangers of delay necessarily incident to the treatment. These are by no means small. Although a tubal pregnancy *may* continue to grow until the thirteenth week or later without rupturing, yet it too often ruptures much earlier. I assisted Dr. Montgomery[2] to operate on a patient to whom this accident happened in the fifth or sixth week. Electricity was being applied at this time.

[1] American Journal of Obstetrics, vol. xxiii. No. 2, 1890.

[2] Annals of Gynecology, July, 1890, p. 542.

Montgomery[1] records yet another case where the rupture took place at five weeks.

Engelmann[2] records a case of the disease where rupture took place earlier than the fourth week, as proved by the size of the gestation-sac and the fact that no menstrual period had been missed.

Dr. R. P. Harris[3] says he knows of two cases where rupture occurred as early as the third or fourth week. They may rupture at any period, no one can predict just when. For this reason, a diagnosis once made, or the disease strongly suspected, it is not safe to adopt a treatment which avowedly must continue over the course of a number of days, and probably a week or two. A case in point is one which was taken by a New York physician to the office of Dr. T. Gaillard Thomas for an opinion. Dr. Thomas diagnosed extra-uterine pregnancy, and advised delay and the use of electricity. While in the streets, on her way home from the doctor's office, the rupture took place, and the woman had a narrow escape with her life. Referring again to the cases in the hands of Dr. Formad, the coroner's physician of Philadelphia, these cases show the rupture to have taken place all the way from an early to a late period. A close inspection of the literature will give plenty of material for thought in this direction for the most sceptical.

3. The dangers during the treatment. These dangers are strenuously denied by many.

Brothers[4] reports four cases where alarming symptoms supervened during or immediately after the treatment, and there are many others in his list where a minor degree of bad symptoms followed.

Coe[5] records a case of extra-uterine pregnancy at the second

[1] Annals of Gynecology, July, 1890, p. 536.
[2] Ibid., May, 1890, p. 376.
[3] Ibid., March, 1890, p. 292.
[4] American Journal of Obstetrics, vol. xxiii., No. 2, 1890.
[5] Ibid., April, 1890.

month, which he had seen in consultation, where the diagnosis was confirmed by the late Dr. Hunter; the faradic current was used, the sac ruptured, and it was easy to detect gradual increase of the resulting hæmatocele.

Janvrin[1] reports a case where death followed the third application of electricity, on account of rupture of a vessel in the wall of the sac.

4. The harm done in case of a mistaken diagnosis. It is contended that no harm can possibly be done in such an event. I have not had time to go over the records and look these cases up, but will refer to one case reported by Dr. T. Hewson Bradford (and which I myself saw), where electricity was passed by Dr. G. Betton Massey through a pelvic mass under a mistaken diagnosis. The case proved to be one of intra-ligamentary cyst. During two applications she became so alarmingly ill that the treatment was discontinued and the knife resorted to by consent of all the physicians concerned in the case. I have at varying times during the past two years seen at least half a dozen patients after a single treatment, in the hands of an expert, go to bed and there remain for a week or more with an alarming attack of peritonitis. Everyone who has had any amount of experience with electricity must have seen similar cases and know only too well that harm may result from sending a current of electricity promiscuously through pelvic growths.

5. The dangers to the patient after the treatment is finished.

Brothers[2] records two cases (Lusk's and Chadwick's) where suppuration with discharge of the fœtus occurred in consequence of the use of electricity.

J. P. Tuttle[3] records a case in which after the electrical treatment he delivered a four months' fœtus per rectum.

G. M. Tuttle[4] records a case of between two and three

[1] Transactions American Gynecological Society, 1887.

[2] American Journal of Obstetrics, vol. xxiii., No. 2, 1890.

[3] Annals of Gynecology, February, 1889.

[4] American Journal of Obstetrics, January, 1890.

months, where the faradic current was applied daily for ten days. He says, "In this case the thorough and intelligent use of electricity for the purpose of destroying the embryo was followed by no evident amelioration of symptoms, which, on the contrary, continued to grow worse with an uninterrupted increase in the size of the tumor." In this case, not only was the danger not abated, but the electricity failed to kill the product of conception.

The claims made by the electricians that, after the death of the fœtus all trouble is passed, would seem to be disproved by these cases, amounting to about eight per cent. of the whole number of women treated and supposed to be cases of ectopic gestation. In addition to these the literature is full of just such cases, where the fœtus has died from other causes than electricity. The after-results, however, of such cases can differ in no way from those killed by electricity. If the claims of the electricians are correct, then from whatever the death, the result must be the same, viz., absorption and shrinkage.

Thompson[1] records a case of extra-uterine pregnancy where death of the fœtus occurred between the second and fourth months. Later, the fœtal bones were passed by the bladder.

Goelet[2] records a case suffering from supposed pelvic hæmatocele. A vaginal incision was made behind the uterus, and a fœtus of about the third month, in a state of decomposition, was removed.

Tuttle[3] records three other cases where the fœtus had died early, and after varying periods of continued suffering the sac and contents had to be removed.

And so it goes all through the literature—the number is legion. In addition to these, Hanks[4] reports that in a series he has collected, in four cases the fœtus sloughed into

[1] American Journal of Obstetrics, August, 1889.
[2] Ibid., January, 1890.
[3] Ibid.
[4] Transactions American Gynecological Society, 1888, p. 361.

the rectum, in one into the bladder, and in four others into the uterus.

Brothers[1] reports a table of fifty cases of supposed extra-uterine pregnancy treated by electricity, all he could collect from the literature (and yet, strange to say, he has missed many with bad or indifferent results, some of which are included in this paper). Of these fifty cases fifteen are noted, after periods of from three months to three years, as still having pelvic masses, some of them as large as a goose-egg, a pigeon-egg, a man's fist, etc. Does anyone doubt that the time is coming when some of these very women will have a repetition of their troubles and will require an operation for their relief? Is this the kind of cure of which the electricians boast.

6. The doubtful nature of the disease in many of the cases reported as treated in this manner. In this connection, does not the fact that fifteen cases (out of the grand total of fifty) still have masses of considerable size in their pelves form presumptive evidence that some of these cases were something else besides ectopic gestation? If the difficulties of diagnosis have not been overcome by the surgical men (as I have proven by many reported cases in the preceding part of this paper), is it at all strange that the electrical men should make as large a proportion of mistakes in the same direction? The same gentlemen who have verified the diagnosis in many of the electrical cases, and on whose opinion the truth of the diagnosis is based, have been proved in other cases to have been mistaken when they made just as positive diagnoses, and have themselves repeatedly said that they have over and over made the mistake. By what reasoning can it be claimed that they are infallible in just the cases in which it is impossible to verify the diagnosis? Nor is this presumptive evidence all there is against the electricians on this point.

[1] American Journal of Obstetrics, vol. xxiii., No. 2, 1890.

Wylie[1] has proved by post-mortem examination that three supposed cases of ectopic gestation, treated by electricity, were not such at all.

In three more (McBurney's, Garrigues's, and Trask's) the fœtus was discharged by the natural passage, viz., from the uterine canal into the vagina, and from the vagina into the world. Almost to a certainty these were cases of normal gestation. It is not at all strange that such a mistake in diagnosis was made; there are many cases on record where a normal pregnancy had been overlooked, even after the sound had been repeatedly passed. The case of Coe, quoted above, in which electricity had failed to relieve, and an exploratory laparotomy revealed a normal pregnancy, is a case in point. Had the exploration not been made, that case would have been on record to-day as a case of interstitial pregnancy in which the electrical treatment had forced the fœtus into the uterus; and with exactly as much ground for the supposition as these three have.

I cannot review each of the reported cases in detail, but shall refer to a few, and show how doubtful was the diagnosis even as reported. But, first, let me call attention to the cases of Cushier and Harrison, the credit for the cure of both of which has been given to electricity, to which it does not belong.

T. Gaillard Thomas saw the case of Cushier's[2] in consultation, and a diagnosis of ruptured interstitial pregnancy was made. Operation was thought of, but was abandoned, partly on account of the condition of the patient, and because the tumor, which had suddenly appeared, was entirely due to the rupture. Cushier at this point says: "During the next few days there was a most marked improvement. The tympanites entirely subsided, and pain was completely controlled . . . . the tumor could now be felt as a circumscribed mass. . . . ."

[1] Transactions American Gynecological Society, 1888, p. 391.
[2] Ibid., 1884, p. 167.

After this, for fear the embryo *might possibly* still live, although all the evidence was strongly against this, and the patient was fast getting well, a faradic current was used, and now, forsooth, this is claimed as an electric cure. It was clearly a case of spontaneous cure.

The case of Harrison's,[1] which was seen by T. Gaillard Thomas, was a very similar one. Harrison himself says that the fœtus was dead when the treatment began, and he protested against its use. Another case of spontaneous cure for which electricity has assumed the credit.

Cocks[2] called T. Gaillard Thomas to see a woman who had last menstruated on December 13, 1883. About the middle of January she began to suffer from pain, nausea, and vomiting. On March 27th, when seen by Thomas, a tumor about the size of a man's fist was discovered to the left of the uterus, which gave the sensation of a tense sac filled with fluid. The following day, or about three and a half months after the last menstruation, the faradic current was passed, and continued daily for eight days, with no change either in the condition of the tumor or the patient. Two weeks later galvanism was begun, sometimes with and at other times without ether, and was continued for eight or nine days, at the end of which time it was found that but little change had taken place. This was at between four and five months. On September 15th, about nine months after the beginning of the attack, it is said: "The pains are much less severe in character, and, though occasionally paroxysms occur, yet they are less violent than formerly, and much less frequent. . . . On examination the tumor is still found, but decidedly smaller, less tense, and less painful on pressure." From the history of this case there is not the slightest chance of its having been a case of ectopic gestation; even Thomas says: "I freely confess that I am not entirely positive about the correctness of my diagnosis," and I think anyone who will

[1] Transactions American Gynecological Society, 1882, p. 230.

[2] Ibid., 1884, p. 172.

carefully read the details as he gives them will quite agree with him in his doubt.

Lambert and Jones[1] record a case of supposed ectopic gestation, and had T. Gaillard Thomas in consultation. I will only remark that all the evidence of this disease being present is contained in an extremely unsatisfactory history. At the consultation Drs. Thomas and Jones pronounced the case one of ectopic gestation, her attending physician, Dr. Lambert, was in doubt, and Dr. Fordyce Barker rejected the diagnosis as made by the other two. In the words of Thomas, "the majority ruled," and the electrical treatment was instituted. The woman went home to the country at the end of ten days and at the last examination had still a pelvic tumor as large as a hen's egg. Is the profession ready to accept without question that diagnosis? I think not.

The two cases of Allen's[2] are both more than doubtful. In the first one the history of ectopic gestation is far from convincing, and three years after the treatment there was a well-defined tumor, of the size of a large fist, very little if any smaller than before treatment. His second case is even more unsatisfactory from a diagnostic point of view, and the tumor still existed of almost its original size when he reported the case.

In the case Wilson[3] reports, he himself says he is "not satisfied it was a case of extra-uterine pregnancy." Dr. Howard saw the patient and was opposed to the diagnosis.

There is no need of producing any more evidence on this point. Any fair-minded, experienced man who will go thoroughly over the details of these cases will soon become convinced that a large number, if not the majority of them, were mistakes in diagnosis. At least they are so dubious that they have no place in scientific discussion.

After what has gone before, it is needless for me to say that I am strongly in favor of the treatment of extra-uterine

[1] Transactions American Gynecological Society, 1884, p. 176.
[2] American Journal of Obstetrics, 1872, p. 161.
[3] Transactions American Gynecological Society, 1882, p. 205.

pregnancy in its early stages by laparotomy, whenever and wherever diagnosed or strongly suspected. When we carefully analyze the cases which have been treated by electricity, eliminating those which are plainly mistakes in diagnosis, or of too doubtful a nature to be of any scientific value, and then place the failures and dangers of the treatment by the side of those remaining (or even by the side of the total number claimed by the electricians), the proportion of disasters is so overwhelming in comparison to those of laparotomy, that to my mind but one conclusion is possible.

In conclusion, I wish to direct attention to the fact that two of the gentlemen who were among the most ardent admirers of the electrical treatment a year ago have at last given up their idol. In 1889, Dr. E. E. Montgomery[1] said: "Electricity affords an agent for the destruction of fœtal life, which experience discloses can be relied upon for the arrest of development and the speedy and safe cure of our patients." In 1890,[2] he says: "I have been led to change my mind by this case, and another in which Dr. Baldy assisted me. This case, with the last one, has shaken the faith I had in the use of electricity."

Dr. George Engelmann[3] says that he had formerly urged the use of electricity in this disease, but he adds: "Increased experience has caused me to waver, and a case recently reported by Dr. Mooney, of this city, has appeared to me so convincing an argument in favor of *immediate operation* at *whatever period* extra-uterine pregnancy may be detected, that I am now an earnest advocate of surgical interference in all such cases."

[1] Transactions American Association of Obstetricians and Gynecologists, 1889

[2] Annals of Gynecology, July, 1890, p. 542.

[3] Ibid., May, 1890.

DISCUSSION ON EXTRA-UTERINE PREGNANCY.

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It is my purpose to discuss certain points or questions under each of the heads to which this discussion is limited, not attempting in so short a time a full and complete review of the whole subject.

First, as to pathology. The view that the union of the male and female elements normally takes place in the uterus I set aside as a theory which is not upheld by certain well-ascertained facts. Be that as it may, in the condition under discussion the union must take place in the tube or beyond, as we cannot imagine the ovum travelling backward after its union with the sperm-cell. That this union often takes place in the tube, and that nearly all ectopic pregnancies are, consequently, originally tubal, is a view now very generally accepted, to which I offer no objection.

But while this may be true of the majority of the cases, there are two exceptions which may be made; one is abdominal, and the other ovarian, pregnancy.

As to abdominal pregnancy the question is still *sub judice*, for it is by no means certain, as is often claimed, that all the cases of so-called abdominal pregnancy have had their origin in the tube, and have obtained their position in the abdomen proper through a tubal rupture. The cases of Müller, of Bern, and of Schlectendahl, mentioned by Lusk,[1] may not be

[1] New York Medical Journal, October 19, 1889.

admitted by all as positive proof, but they certainly strongly point that way. The cases of McCollom,[1] and of Currier,[2] seem to have been tubo-abdominal previous to rupture. There are other similar cases on record, all of which go to show that abdominal pregnancy, while generally tubal in its beginning, is not necessarily always so.

As to ovarian pregnancy, there can no longer be any doubt of its occurrence. The case of Patenko, cited by Lusk, is positive evidence in itself, but the case of Gottschalk[3] shown to a society in Berlin, can leave no possible doubt. Strangely, this case has been entirely overlooked by most writers on this subject. G. describes a tumor, soft, and as large as an orange, behind the uterus. The pregnancy was advanced to between the third and fourth weeks. On its removal, having been mistaken for an ovarian cyst, the tumor was found to be an ovary containing a very thin-walled cyst, in which there was an embryo 0.7 cm. in length. Both tubes were normal. This leaves no doubt; nor, I think, does the specimen which I showed to this Society in 1888 come much behind it. Nearly everybody who saw the specimen was convinced that it was an ovarian pregnancy. The embryo was then absent, but we have the testimony of a very competent observer that it was present when the specimen was first removed from the body. Dr. Johnstone thought it was a dermoid cyst. His argument was something like this: Mr. Bland Sutton says you may expect almost anything in a dermoid cyst. Placenta is almost anything, and therefore may be found in a dermoid. It was found in this specimen, therefore it is a dermoid. Now, I challenge Dr. Johnstone to show when and where a particle of placental tissue was ever found in a dermoid tumor; and still more a well-formed placenta. In my case there were no traces of any hair, bones, teeth, skin, or fatty matter—the "almost anythings" usually found in dermoids;

[1] New York Medical Journal, May, 1888.
[2] Annals of Gynecology.
[3] Centralblatt f. Gynakälogie, 1886, p. 727.

but there was a cyst of the ovary, with fluid like amniotic fluid, and a placenta. I will not take your time to discuss this case any more, but refer you to a fuller discussion elsewhere.[1]

I think, then, we can set it down as fairly proved that ovarian pregnancy does exist, at the same time admitting that it is very rare.

Leaving the many other disputed and interesting questions of pathology, and granting that most ectopic pregnancies are tubal in their origin, the question at once comes up, Can this condition be diagnosed?

Few questions in gynecology have caused a more heated and personal discussion. One side claims that rarely can a diagnosis be made with anything like certainty before rupture has taken place. All sorts of arguments have been used to uphold this view, including ridicule and personalities which ought never enter into a scientific discussion. The other side claims that a large majority of cases, even ninety-five per cent., can be diagnosed very early, and before any symptoms of rupture have occurred; and they point to certain signs and symptoms which are considered as making up a clinical picture which cannot be mistaken, and which, when taken with the objective symptoms, leave no doubt as to the diagnosis.

One side points to the experience of a prominent operator who claims to have had an immense number of cases, and who has had but one opportunity of seeing a case before rupture. The others cite the experience of some of the most prominent gynecologists, nearly all Americans, who claim to have seen and diagnosed a large number of cases.

The matter seems to me to stand in this way: A sufficient number of cases have now been seen, in which an early diagnosis was made, and verified by operation or otherwise (I have collected twelve cases), to make it sure that a certain propor-

[1] Medical Press of Western New York, 1889, p. 94.

tion of cases can be correctly diagnosed very early in pregnancy. Dr. Sutton will, doubtless, relate to the Society a case recently seen by him, in which an unruptured tubal fœtation was diagnosed very early, and subsequently removed by Dr. Temple, of Toronto. Another late example is that of Dr. Pratt.[1] Tubal pregnancy, then, has been, and therefore can be, correctly diagnosed before rupture. But this does not alter the fact that in a considerable proportion of cases rupture takes place before the existence of pregnancy is even suspected, and that the early diagnosis before signs of tubal rupture is rare.

If a careful study is made of those cases which have been reported as having been diagnosed, operated upon, or treated with electricity or otherwise, it will be seen that in a majority of instances there were those certain symptoms present which are now generally recognized as belonging to the early stages of tubal pregnancy. These symptoms are well classified by J. C. Reeve, as Suggestive, Presumptive, and Certain. They are familiar to you all.

On the other hand, we have a larger number of cases in which no such symptoms were seen, and in which rupture and hemorrhage into the abdomen was the first thing to give evidence of the existence of any trouble.

How can we harmonize these facts, for facts they are? I think in this way: Tubal pregnancy, according to some, generally ruptures before the fourteenth week. This rupture may take place gradually or at once, and either into the abdominal cavity or following the place of least resistance into and between the folds of the broad ligament. If we accept the view that in all the cases in which we have the symptoms before referred to, well marked, either slight partial rupture into the abdomen, or else rupture into the broad ligament has taken place, and that the pain, collapse, and other

[1] Transactions New York State Medical Society, 1889.

signs were due to successive ruptures, we can explain much that has been hitherto hazy.

The physical signs generally found are also, thus, much better understood. The tense, fixed, tender tumor on one side of the uterus can best be explained by supposing a rupture into the broad ligament, and the same is true of the physical conditions revealed by the operation of elytrotomy, in the few cases in which it has been performed.

In upholding this view I do not wish it to be supposed that I would apply it to all cases in which a diagnosis has been made. The case of Drs. Sutton and Temple alone would upset this view, for a diagnosis was made and an unruptured tube obtained; but such cases, I maintain, are the exception and can only very rarely be diagnosed, the symptoms generally being too poorly defined.

To sum up, then, this part of my argument, I have tried to maintain: that ectopic gestation is generally, though not always, primarily in the tube; that many cases rupture into the abdomen and are unrecognized until that event has taken place; that a certain small number are diagnosed before any marked degree of rupture has occurred, but that in the majority of instances where early diagnosis is made, rupture has already taken place into the folds of the broad ligaments, with the production of certain symptoms which may be considered as pathognomonic.

Accepting this view, a plan of treatment can be more easily agreed upon. When rupture into the abdomen takes place, as shown by the train of symptoms which has so frequently been observed, there can be no question as to what ought to be done. The abdomen should be opened, the bleeding point tied, and the sac and blood removed. Suppose, again, that the diagnosis of ovarian or tubal pregnancy is made before rupture. In this case I would not object to laparotomy, provided a skilled and experienced operator and suitable surroundings can be obtained. If, however, this cannot be done, rather than trust a neophyte with so important an operation,

or if any other good reason could be given, I would advise the use of electricity, having perfect confidence in its efficacy, placing it fully on a par with operation. If there is evidence to think that rupture has taken place into the broad ligament, then what shall we do? I pass by as unworthy of serious consideration the preposterous proposition that these cases should be left alone in the interest of the child. The risks of secondary rupture—that is, rupture into the abdominal cavity—are too great to warrant any such treatment. Moreover, the percentage of successful cases in which the child and the mother have both been saved by operation at term is too small. Until better results are shown than those thus far reported from credible sources, it would seem cruel to allow a woman to run such a risk, for the sake of a child whose chances for life are so very small under any circumstances. If they are not to be left alone, what then should be done with them? Shall we remove the fœtus, sac and all, or shall we attempt its destruction *in situ*, leaving to beneficent nature the task of removing it by gentler and safer means.

To some, the mere fact that a rupture, even of a slight degree, had occurred, would be an indication for immediate operation. To my mind the contrary would be the case, and my feeling is still in favor of electricity in these cases. I stick to this plan because I believe it to be the best one for general use in the interests both of the woman and of surgery.

In daring to advocate electricity, I know I run the risk of subjecting myself to insult, ridicule, and obloquy, for we find in works which pretend to decency and which are considered as authority by some, such sentences as this: "There can be, there clearly is from the statements of those who have tried these plans (electricity, puncture, etc.), neither certainty nor safety about them; and they will commend themselves only to such as, by lack of courage and skill to obtain good results, have only bad records to show in abdominal section." (Tait, p. 460.) It has, indeed, come to a pretty pass when a man must defend himself for not opening the

abdomen when he feels confident that he can do as well for his patient by some other plan. Must a man become a veritable Jack-the-Ripper to satisfy these thirsters after blood. Some men seem to be so narrow-minded that they cannot admit into their heads an idea which did not originate very near home.

But I can assure my possible critics that I am not afraid to open the abdomen, having done so more than two hundred times; nor am I personally afraid that my operating will unnecessarily risk the woman's life, for I am willing to compare my results with anyone. I am proud to say that my last hundred laparotomies—cœliotomies must we say?—show only a single death which can be attributed to the operation. Nor do I advocate electricity because I am afraid to try a new, and to me unfamiliar operation; for as principal or assistant I have been engaged in nearly every kind of operation which is done within the abdomen, some of them most desperate and difficult, including two for extra-uterine pregnancy.

No, Mr. President, it is not because I am afraid, as has been so often insinuated against the advocates of electricity, but because I believe that in the long run the use of electricity in these cases will save more women than any other plan of treatment yet suggested.

Before answering the objections urged against electricity let me state the exact method which I advocate, as something depends on that.

It makes but little difference which kind of electricity is used, as far as its fœticidal qualities go, but in order to answer certain objections I would confine myself to the faradic or induced current. Galvano-puncture of the sac is never to be used under any circumstances, and has been used very little, if at all, in this country.

Also, I would, with our present light, restrict its use to the first four months of gestation, believing that after that period the danger of suppuration, rather than absorption,

is too great. Also the current should be as strong as can be borne.

What are the objections ordinarily urged against electricity?

The first is, that as an infallible diagnosis cannot be made, there may be bad results from passing the powerful currents necessary through inflamed masses, tumors, etc., for which extra-uterine pregnancy may be mistaken. This I deny, there being no facts to substantiate any such theory. The faradic current cannot do harm, even supposing that a suppurating mass exist, nor can it induce suppuration in an inflammatory mass existing, but not containing pus.

A powerful galvanic current, if pus is present, will undoubtedly do harm, but not so the faradic. Dr. Brothers,[1] whose valuable paper I shall quote from again, says: "It has not been proved that injury has been done by treating other tumors than those of ectopic gestation with electricity."

That the use of electricity causes loss of valuable time and thus gives a chance for rupture to occur, as was claimed in Janvrin's case, I do not believe. In my cases, and in those of others, the shrinkage of the breasts and the diminution in the tension of the cyst began to show themselves at once, showing the promptness of the action. If the child is killed at once, as I believe it ought to be, if a strong enough faradic current is used, all danger of rupture is then over.

Dr. Johnston thinks the electricity may have a bad, even fatal, influence on the heart, through shock to the pelvic sympathetic. This is pure theory, and has absolutely no facts in practice to support it.

Another danger which is based almost wholly on theory, is that to be derived from the continued growth of the placenta after the death of the fœtus. In Brothers's series of fifty cases there was no such thing noticed, nor has there ever been, as

[1] "Subsequent Behavior of Cases of Extra-uterine Pregnancy, treated by Electricity." American Journal of Obstetrics, vol. xxiii., 1890.

far as I can learn, anything to support this idea in practice. It is theory, pure and simple, based on facts which have no direct relation to the cases in point. The study of what has happened is much more instructive than flights of fancy as to what may happen. Has there ever been a case of extra-uterine pregnancy cured by electricity in which the placenta has given any subsequent trouble? I have never seen or heard of such a case, and must, therefore, remain entirely sceptical as to its possibility.

The danger of suppuration seems to be more real; but careful analyses of the cases in which it has occurred show that this is very slight. In fifty cases it has occurred only once where the sac was not punctured. In this case (Chadwick's) the fœtus had advanced to the fifth month, past the period at which electricity is now generally advised.

The danger of causing rupture also seems to be chimerical. The case of Janvrin, in which death occurred after the third application, could not have been caused by electricity. Janvrin, himself, did not credit the electricity with the death. In no other case has there been anything like symptoms of rupture following.

The objections founded on remote results do not, in the light of present experience, seem to have any more weight than those to which I have already alluded. I quote from Brothers: "We can thus positively state that twenty-five patients (reported cured) have been heard from after a lapse of from one to eight years, and that when last seen all were reported well. Many of them still carried traces of the old trouble, and, while it would be unfair to assert that these little masses could in the course of time never become troublesome, still the fact remains that, as far as I have been able to discover, they have, up to the present, caused no inconvenience.

Dr. Johnstone, says: "So much for the absolute risks to life; but there is still another (and to me an insuperable) objection and that is, the months and even years of invalid-

ism which this method must entail." I protest that this is not supported by the facts. In the cases that I have seen the recovery has been remarkably prompt and uneventful. The patients have been up and out sooner and have suffered less than is possible after the most simple laparotomy. There were no months, and certainly not years, of invalidism and suffering, and now that years have passed since they were treated, I see and hear nothing of invalidism and illness. I must reject all such allegations based on such suppositions. Dr. Brothers's statistics effectually disprove this statement.

Again, the advocates of electricity are accused of advocating an unsurgical procedure. Against this I enter a most solemn protest. As well say that a surgeon who treats a fractured femur with a splint is unsurgical, because he does not cut down at once and wire the ends of the bone together. I deny the right of any man to call a method unsurgical which can show as good a record, all things taken together, as electricity in this condition, and one as free from risk to the patient. I am a surgeon, perfectly willing to cut, when cutting offers the best chance for my patient; but I am unwilling to use the knife if I think I can save and cure her by what I consider to be a less hazardous method.

But are there no objections to laparotomy? Unfortunately there have been too few cases as yet operated on before rupture to allow of our making any very extensive statistics. Of cases operated on after rupture into the broad ligament there is little or nothing to be said. Still I cannot but admit that in those cases operated on before or after rupture—almost without exception, by skilled operators, and under most favorable circumstance—the results have been good. Why then, it may be asked, not advocate operation always? Because, I reply, the cases are still few, one operator's cases excepted, from which we may judge, and because the results of electricity are as good, if not better. Again, circumstances will often be unfavorable. The skill of an experienced opera-

tor may be unobtainable. Patients have a great dread and horror of an operation, and often it is impossible to persuade them to submit to it.

The shock and anxiety caused to friends and relations are not to be made light of, and are often a real objection, though it is very easy to make light of them in a discussion. Moreover, no matter by whom performed, there is a risk in a laparotomy which, in my belief, should and can be avoided.

The uncertainty in the diagnosis, unless urgent symptoms are present, is certainly much more an argument against operation than against electricity. It is the ultimatum, from which when done there is no appeal, and which often leaves, as its sequel, many unpleasant symptoms. On the other hand, if electricity fails or the diagnosis is proved to be wrong, no harm can be done by the current. As to failure, I do not believe it possible if the battery is properly used.

From the cases which I have seen and examined, which were, to my mind, undoubted cases of tubal pregnancy with rupture into the broad ligament, some six in number, I can easily imagine that an operation would have been difficult and dangerous, even in the hands of an experienced laparotomist. Those of us who are operators know the difficulties presented by an intra-ligamentous ovarian cyst. I can imagine that an intra-ligamentous pregnancy would present similar difficulties.

It seems to me, then, in the light of what we know regarding the natural history of ectopic gestation, and in the light of experience up to to-day, that we ought to advocate and practise electrical fœticide in most cases seen during the first four months of extra-uterine gestation and before symptoms of rupture into the abdomen have occurred. For I think a lot of fanciful and theoretical objections have been raised which are not warranted by experience or the facts.

Much has been made of a few mistakes, and cases have been distorted and made to act as arguments which ought

never to have been so used. What if somebody has made an error and mistaken a cyst of the Fallopian tube for a tubal pregnancy; is that an argument to be used as against the possibility of ever making a right diagnosis, in view of the fact that we have incontestable evidence that other men of no greater experience have a number of times correctly diagnosed these cases? Are all the cases to be set aside as mistakes because one man has been falsely accused of making a mistake? Certainly such a judgment would be unfair and would not be treating the matter with the true scientific spirit. Just as well say that because our very best diagnosticians have mistaken a pleurisy for a pneumonia, that all diagnoses of pneumonia are failures, and that in view of the abundant testimony of the dead-house.

It is objected by Dr. Baldy[1] that the advocates of the early diagnosis and electrical treatment are drawn from the ranks of those who acknowledge that they have only such knowledge as they obtain from literature. But how can Dr. Baldy explain the cases in which it has been claimed that a diagnosis was made, the symptoms being present, and in which the patient has promptly and perfectly recovered after electricity? We know of no other condition which will yield so promptly to the faradic current. Ovarian tumors, inflammatory swellings, and pus tubes, unfortunately, will not disappear so easily. If these cases are not extra-uterine pregnancy, I demand some reasonable explanation of what they are.

So to sum up the whole matter: one party says, We can never be sure of our diagnosis, so we always cut down to see. The other side says, We can generally be morally sure of our diagnosis and generally cure the patient without cutting; and so it stands. Which is right? Which is the better plan?

[1] "The Early Diagnosis of Extra-uterine Pregnancy."

Regarding the so-called primary objection, that is, operation at or near term on a living child, I have little to say. The only case I have seen had a melancholy termination, I waited for the death of the child, and waited too long afterward. Perhaps the methods will be so perfected in the future that operation at term will become the accepted method. At present, all I can say to anyone having a case is: Use your best judgment according to our present light.

GENERAL DISCUSSION.

Dr. A. J. C. Skene, of Brooklyn.—With reference to the question of diagnosis. I think you will all admit that it is highly important that the diagnosis should be made with all possible certainty both by those who believe in the treatment by electricity, as well as those who believe that laparotomy is the only treatment. Surely patients with an extra-uterine pregnancy are in a safer position when their condition is known to someone, so that when they are *in extremis* they can be attended to; in other words, it is highly essential and important that we should make a diagnosis. Now, so much has been said about the difficulty of making a diagnosis that one hesitates a little to express one's opinion strongly on the subject, and yet I am inclined to do so. I believe that extra-uterine pregnancy is as easy of diagnosis as any known affection of the pelvic organs of women. With complicated cases like the one reported by Dr. Jewett, in which the anatomy of the pelvic organs is all changed by a former peritonitis, it is difficult; but so it is in any part of the body under like conditions. Complications render diagnosis more difficult, it is true; but in an uncomplicated case of ectopic gestation I hold that, with due care in noting the history of the case and its peculiar characteristics, and the physical signs, the diagnosis can be made as positively as anything else—as pyosalpinx or ovarian cyst, for example. There may be a shadow of doubt in the minds of the best diagnosticians, but is not that so in any diagnosis?

It is of the greatest importance, then, that we should make a diagnosis, which we can do if we will take the time and trouble. It is very true that some patients do not apply to the physician until rupture occurs, and then a diagnosis is only made after laparotomy. We complain that sometimes patients with cancer of the uterus come to us too late for us to do anything, that the diagnosis is not made in time for us to institute the proper treatment; so it is with extra-uterine pregnancy, but these are exceptions, and not evidence against the possibility of making a diagnosis.

It would be folly for me to go over the ground in regard to the methods and means of diagnosis, with which you are all familiar but there is one condition that very closely simulates tubal gestation, and that is, pregnancy in one horn of the uterus bicornis. I have seen such a condition, which first came under observation for dysmenorrhœa. I may say that while there was a uterus bicornis, the patient came very near having a uterus unicornis, for the development of one horn fell far short of the other. I believe that menstruation was from the right horn. I treated her for disease of the right side and she recovered. She subsequently became pregnant, and came back to me with a history of amenorrhœa. I made an examination, and made up my mind at once that it was a case of pregnancy in one horn of her uterus, but if I had not seen her before and known all about her case, I would have said positively that it was a case of tubal pregnancy. The sac was soft, fluctuating, and movable, lay in the region of the right tube, and looked and appeared on examination exactly like a tubal pregnancy. Excluding then, this one condition, I know of nothing else which we cannot differentiate with as much certainty as in any other diagnosis.

That is all I have to say about the question of diagnosis, except that I do not believe that any of the mistakes which have been recorded prove anything. They always will be made occasionally; first, by those who are not good diagnosticians, and also in complicated cases, but as a rule the diagnosis can be made.

Just a word about the question of treatment, not that I propose to take one side or the other (for I think the house is pretty well divided, as I can understand it, into those who do and those

who do not believe in the use of electricity), although I may betray myself before I have said much.

In reference to the question of electricity. I regret that a question of so much importance as this should have been discussed as it has. I think there has been too much positive statement on both sides. In Dr. Baldy's paper reference was made to the boasting of the electricians. Now, if I am correct in my observations, I think the boasting has been quite as much on one side as the other. At any rate, what I regret (I hope it will stop for al time) is this merciless condemnation one of the other. This de claring positively that electricity is nonsense and that it is criminal to use it, and that it is fraught with all sorts of dangers, and should be condemned to all eternity—is all wrong; that is not the true sort of scientific discussion, and never leads to any proper conclusions. Such discussions remind me of disputes among schoolboys, where I have noticed that almost always the boy who has talked the most, and called his opponent the ugliest names, is the one that got beaten. Now if that rule obtains among older boys the laparotomists are going to be beaten by the electricians. One more point in reference to electricity—I have yet to hear anything that is at all evidence that electricity is specially dangerous. Now, if you see a case why not use it, and supposing it does not succeed, why can you not open the abdomen and remove the diseased portions? That is the great argument in favor of trying electricity, that it does not render the case one particle less amenable to surgical treatment by operation than if you had not used it at all, so it has the great advantage of being safe.

Have you noticed how often to-day the expression "competent hands," has been brought before you—laparotomy in "competent hands?" Now how many cases of laparotomy happen to fall into "competent hands" just at the moment when it is necessary to operate? These are emergency cases, and many must fall into inexperienced hands, and I believe that when you get the histories of all the cases that have been operated upon by non-competent hands, you will perhaps hesitate a little more about condemning electricity. But I simply want to throw out these suggestions in the hope that neither side will be so absolutely positive and certain as they seem to be at the present time. We

can well afford to wait for more facts before settling down to fixed opinions.

Dr. W. W. Jaggard, of Chicago.—We have all read with great interest Dr. Johnstone's researches into the anatomy of the mucous membrane of the uterus during menstruation. Unfortunately, up to the present time, his remarkable views have not been corroborated by any reliable observer. This Society would do well to appoint a small committee to prosecute research in this direction. Certainly Dr. Johnstone's views as to the spermatozoids determining the site of the placenta are most extraordinary. It seems a little far-fetched, however, to bring in the cessation of the influence of the spermatozoids as the determining cause of labor; that is carrying the action of a living ferment a little too far, even for transcendentalists.

It is useless to discuss matters of fact. The occurrence of ovarian pregnancy has been definitively established. Werth has established the anatomical diagnosis of ovarian pregnancy. Ovarian pregnancy does occur. I saw the specimen that Dr. Mann presented at the meeting of the Society in Washington two years ago. I think it is useless to discuss that case, as no exact microscopical examination was made to demonstrate the presence of decidua and villi; I thought it looked like a tubal pregnancy and not like a dermoid cyst. Many cases of hæmato-salpinx are really cases of tubal pregnancy. Kellar's paper is of interest in this connection. I have removed the tubes in two cases of hæmato-salpinx in which I suspected tubal pregnancy.

The natural history of tubal pregnancy is very complicated. We can recognize at least three terminations: 1. death of the ovum before rupture; 2. rupture between the eighth and twelfth weeks; 3. persistence until term. When the tube does rupture, there are a number of sub-terminations, viz: 1. It may rupture into the broad ligament, with formation of hæmatoma of the broad ligament, or terminate in an extra-peritoneal pregnancy. 2. After rupture the ovum may remain *in situ*, and plug, acting as a spontaneous tampon. 3. It may rupture with formation of retro-uterine hæmatocele. 4. Rupture into the peritoneal cavity with free intra-peritoneal hemorrhage, and death primarily from anæmia, or secondarily from peritonitis. All but the last are

relatively favorable terminations, and the rule is, ruptured tubal pregnancy terminates in recovery.

I was very much pleased with the admirable remarks of Dr. Skene, and I fully agree with him that the diagnosis of uncomplicated extra-uterine pregnancy is easy. Usually there are symptoms enough to attract the patient's attention; and often there is an opportunity presented for diagnosis. About eight weeks ago I saw, in consultation with Dr. Henry W. Banga, of Chicago, a typical case of tubal pregnancy before rupture, which we diagnosed before rupture and operated upon, removing the tube and ovum, the woman recovering. The diagnostic points were: 1. A slight bluish discoloration of the anterior vaginal wall immediately below the meatus urinatus. 2. Softening and compressibility of the lower uterine segment (Hegar's sign). This was made out, the woman being under ether, by putting two fingers on the abdominal wall and one in the vagina, and approximating the fingers. 3. The uterus was displaced from the median line to the left, retroflexed, enlarged, and of a peculiar soft, doughy consistence—one of the most reliable signs of early pregnancy. To the right of the median line, a well-marked, lemon-shaped, slightly-mobile, soft, non-fluctuating tumor that resembled in some degree a small ovarian cyst. (I do not think the tumor was any larger than a good-sized lemon.) These, in brief, were the objective phenomena on which the diagnosis of extra-uterine pregnancy was based. There were symptoms of amenorrhœa existing for over six weeks, and pains referred to the pelvis. Two weeks before I saw the case there was slight hæmorrhage; there was no exfoliation of the mucous membrane or of decidua. Dr. Banga operated two days after the diagnosis was agreed upon.

In connection with this case, which will be reported more fully, there are a number of points of interest in regard to diagnosis. In the first place, the woman was a Jewess, and among Jews extra-uterine pregnancy is very uncommon. She was a multipara, having had three children. Two children were born at regular intervals of about two years; then an interval of about three years elapsed before the next pregnancy. This pregnancy was the right tube. All these facts are of interest in the matter

of diagnosis, and the typical history of extra-uterine pregnancy is that it occurs in old multiparæ after a long interval between pregnancies, or in primiparæ who have been sterile for a long period.

The evidence is conclusive in favor of laparotomy in cases in which the diagnosis is made before rupture. I have noticed with some surprise that no allusion whatever has been made to Dr. Veit's paper on the "Diagnosis and Treatment of Early Tubal Pregnancy." He has had some seven cases, in which diagnosis was made before rupture, in which the operation was performed, and all recovered—a better result than has been achieved by any other mode of treatment.

There are at least two objections to the use of electricity: 1. The danger of rupture of the sac. More than one hundred years ago it was proposed to put one hand in the vagina and one over the belly, and bring the hands together, causing the sac to rupture. I think that is the usual effect when strong faradic currents are used. 2. The uncertainty in diagnosis. In none of the cases can it be made with absolute certainty, and this uncertainty is very harmful. 3. After the eighth week it is hopeless to expect the absorption of the fœtus or placenta.

Just a word as regards treatment after rupture. The universal proposition that every case of ruptured tubal pregnancy is an indication for laparotomy cannot be maintained. The natural history of the condition shows that ruptured tubal pregnancy in the majority of cases terminates in recovery, and it is the exceptional cases that perish from free intra-peritoneal hemorrhage or peritonitis. In such cases the indication for the performance of laparotomy is perfectly clear. In the event of hæmatoma of the broad ligament, broad-ligament pregnancy, rupture of the tube, with the clot acting as a tampon, or in hæmatocele, the indication is clearly against laparotomy, and in favor of palliative measures.

When gentlemen report cases of extra-uterine pregnancy, operated upon or seen after death, it seems to me that they are placed under a formal obligation to give an exact anatomical diagnosis. To say that certain bystanders thought the object inspected was the product of conception is insufficient. To

prove the fact portions of placental villi, decidua, or fœtus must be demonstrated.

Dr. H. P. C. Wilson, of Baltimore.—We have been very much interested this morning by these papers, all of which are very able. I am glad Dr. Skene, who always does everything so much better than I can do it, has made my speech for me, for I am sure that I could not have made it one-tenth as well as he. I agree with every word he uttered, and his views are exactly my views on this subject.

I shall not say anything in regard to the pathology of this disease. I believe, as I think we all believe, that extra-uterine pregnancy is frequent. I believe, as much as I believe anything, that ovarian pregnancy occurs very rarely, though sometimes an ovum does become fecundated, and is dropped from the infundibulum into the abdominal cavity. I believe that we have all met with those conditions, but I shall not detain you upon that point of the discussion.

I have a few words to say as to the treatment. I am not an electrical man, nor am I a surgical man on this subject; I am both, sir. I know that we can make as accurate a diagnosis of this trouble as we can make of any other which we are called upon to diagnose. I believe that if we diagnose an ectopic pregnancy in its early stages electricity is the agent to be used.

I will not say with my friend Dr. Mann, whose paper I enjoyed so much, that the time should be extended to four months, but I believe that if we diagnose an ectopic pregnancy before three months we can destroy it by electricity. I know that I have destroyed ectopic pregnancies in these early stages. And if we fail in destroying the fœtus in its early stage, and the symptoms go on, we have surgery left to us. I believe as much in surgical interference as in the electrical method, and if I did not destroy the fœtus before the third month, I would most certainly operate after three months and remove it. But usually in the early stages of ectopic pregnancy the women are in good health. They may have attacks of pain, and call you up at night to relieve violent pain, and sometimes you will hardly get an opportunity to make your diagnosis. They go on then very comfortably for some time, and they cannot believe that such a serious thing as

cutting into the abdomen is necessary, so that they will hardly ever let you operate. You may in the case of hospital patients operate in the beginning, but in the better class, with their husbands and friends around them, you will not be able, as a rule, to induce them to allow their bellies to be opened for an ectopic pregnancy. In these cases I would most certainly use electricity. If the case went on beyond three months I would cut and remove the fœtus.

Another thing, Mr. President, is to be considered in reference to electricity. As Dr. Skene remarked, a great deal has been said about "competent hands." Now, how few cases of ectopic pregnancy fall into the hands of men who are prepared to do laparotomy! There was a great deal said in Dr. Baldy's paper about the damage done by electricity. I have used it extensively in my practice, and I have never seen any patient injured by its use. I think that in the hands of those who have studied the subject and use it properly, it is as safe a remedy as any that can be employed. I cannot see the slightest objection in a case of ectopic pregnancy, diagnosed early, why we should not use electricity, and when it fails perform laparotomy.

Dr. Howard A. Kelly, of Baltimore.—I have been very much interested in this discussion, and especially glad to note that although the factions still differ in many particulars they are so much in accord. The discussion has, it is true, been sharp, but it has lost the bitterness of a few years ago.

History: It is of interest to glance back to some of the early records and note how this discussion has come to us as a heritage of more than a hundred years. I hold here a pamphlet which I recently prepared for a discussion on this subject before the Baltimore Gynecological and Obstetrical Society. This contains an electrotype taken from Mauriceau's case, occurring in the year 1669. His quaint record in Latin runs as follows: "*History of a woman in whose abdomen there was found after death a small fœtus about two and a half inches long, together with a great quantity of coagulated blood. The history of this case deserves to be carefully examined into to decide whether the fœtus (as believed by many) was generated in the ejaculatory vessel, called the tube of the womb.*"

"On the 6th of January, 1669, in the village of Corrari, I saw in the hands of a chirurgus, called Benedict Vassal, a uterus,

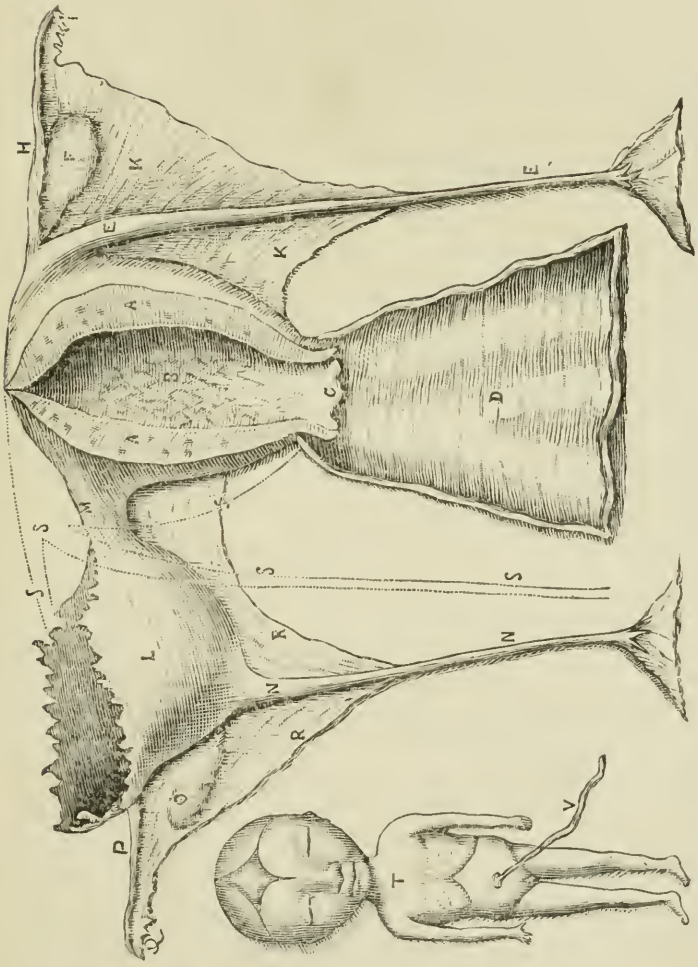


FIG. 1.

This cut is taken from Mauriceau's work, referred to, and shows the fetus and the ruptured rudimentary horn of the uterus.

the picture of which is shown, which the same chirurgus had a short time before removed from the body of a woman aged thirty-two, who died after three whole days of torture with the most

agonizing pains in the stomach, through which she had fallen into frequent spells and the most violent convulsions."

Mauriceau goes on to state that he is very much opposed to this being mistaken for a tubal pregnancy, which, indeed, it was not. "Many have brought forward this case to prove to us that the testes (ovaries) of women are full of little ova which, at the moment of coitus, freeing themselves and emerging from the body proper of the testes (ovaries) are borne into the uterus through the tube afterward to serve for the generation of the fœtus; and one of those so-called ova had by chance remained in the tube of this woman, instead of passing forward into the uterus, and that this was the cause of her death. Regnus Graaf, who discovered the Graafian follicle, among others holds this opinion, for the confirmation of which he brings forward the figure of this uterus which he painted from this case, which the chirurgus, of whom I have spoken, had already given to the public (as one finds it on the 360th page of his book *On the Generative Organs of Women*), but anyone who will carefully and without prejudice examine the following figure, which is most faithful and faultless, and at the same time examine into our reasons, will find that we have given another demonstration, and that we believe that to be the true explanation." Mauriceau considered the case to be one of a hernia from the corpus uteri. It is really, however, a pregnancy in the rudimentary cornu uteri, as demonstrated by the neck and the bridge of tissue between the fœtal sac and the uterus. That it is not a simple tubal pregnancy is shown by the presence of the round ligament displaced outward.

Aside from the work of Mauriceau I would like to call attention to other excellent work done in the last century in this field; here, for example, is a plate which I have reproduced from the work of Deutsch, published in Halle in 1792, containing a series of beautiful life-size copper-plates of an abdominal extra-uterine pregnancy. The fœtus is seen lying outside the belly of the mother, still attached to the placenta by the cord.

As to the different kinds of extra-uterine pregnancy, I think, Mr. President, it is important for each man to state his belief.

Interstitial, tubal, and ovarian have been clearly demonstrated, while tubo-ovarian and primary abdominal remain to be proved. Ovarian pregnancy has been proved beyond doubt or cavil. Let any man inclined to doubt study the cases of Speigelberg, Leopold, Gottschalk (in the *Centralblatt*, 1886), and Patenko. The tubal may be topographically divided into interstitial, isthmial, isthmio-ampullar, and ampullar, according as it is situated at the uterine, inner, middle, or outer end of the tube.

It is very important to be thoroughly familiar with the critique of ovarian pregnancy. To establish it, in the first place, there must be an extra-uterine fœtal sac, the tube of that side remaining intact; the sac must hold somewhat the same relations to the uterus as the normal ovary. Most important is it to see that on the inner side of the sac there exists a short ligament, connecting the sac with the uterus; this is the ovarian ligament. The relation of the ovarian ligament to the sac in an ovarian pregnancy is as important in the establishment of the fact as is the outward displacement of the round ligament in the establishment of an interstitial pregnancy.

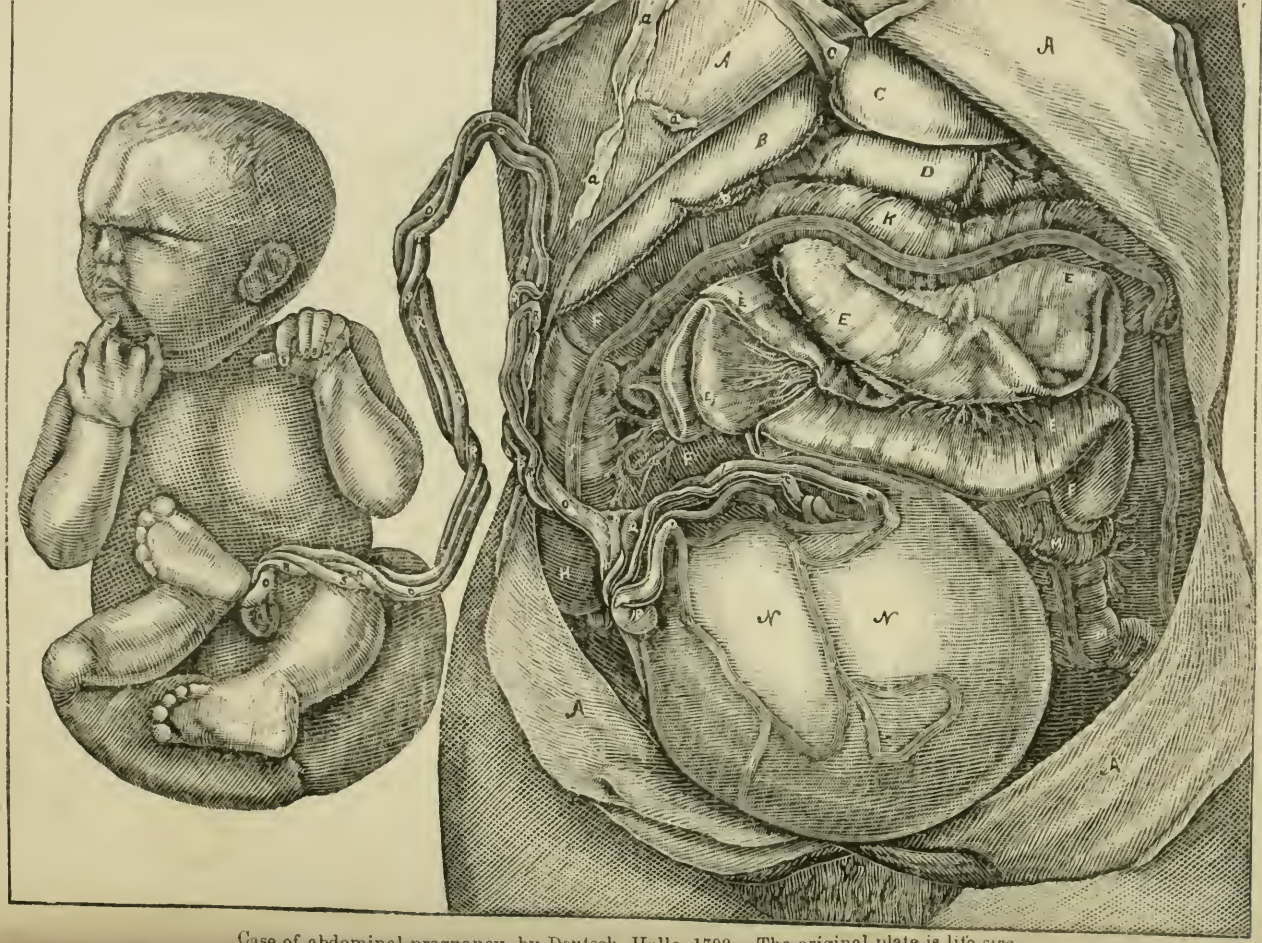
In the case of a woman who had gone five months beyond term with a tubal pregnancy, and was operated upon by Dr. Robb, Dr. Welch found ovarian tissue in the walls of the sac. The case was proved to be an unruptured tubal pregnancy. It is certain, therefore, that the presence of the ovarian tissue in the walls of the sac is not alone conclusive evidence as to the fact of ovarian pregnancy.

Let me here correct an historical error which has gained considerable prevalence. The discoverer of the interstitial form of extra-uterine pregnancy was not Breschet,[1] but Schmidt,[2] in 1801.

Diagnosis: This is most important and interesting. First of all, I have been much amused for some years in watching the manner in which the men who oppose the possibility of making a diagnosis, have, like clever swordsmen, shifted their ground. It was originally asserted, in broad terms, that *a diagnosis of extra-uterine pregnancy could not be made*, and that the condition was

[1] Mém. sur une nouvelle espèce de Gros. extra-utérine. Paris, 1826.

[2] Beob. der k. k. Med.-Chir. Jos. Akad., Wien, 1801.



Case of abdominal pregnancy, by Deutsch, Halle, 1799. The original plate is life size.

only found by chance at the operation. So many diagnoses have been so clearly made, in cases in which rupture has occurred before the operation, that the opponents of the possibility of diagnosis have shifted about and taken the new stand that no man can diagnose a case *before rupture*. But they have been routed even from this last foothold. It is true, we see relatively few cases before rupture, but my own simple case, long since quoted and now historical, upsets all negative assertions. It was as follows—and Dr. Robb, who was invited to "attend an operation for an unruptured tubal pregnancy," is here to-day and will corroborate my statement:

The woman had been married three years, and had had one child and one premature stillbirth. She applied to me early in December, 1885, when she stated that her monthly sickness had been regular up to July; from July until the middle of November she had not menstruated. Menstruation came on in the middle of November, with a discharge of something "like a piece of flesh." In October she noticed a lump on the right side, low down, which pained her severely; the pain remained constant until the flow came on, when she was relieved.

I found a slight amount of milk in the withered breasts, and a little wax on the nipples, and discovered a smooth, tense, elongated tumor, anterior to the cervix, the latter being displaced far back in the sacral hollow. The tumor was easily felt covering the whole extent of the anterior vaginal wall, ovoid and moderately movable—extending above, half way to the umbilicus. It had a peculiar tense, fluctuant feeling. The uterus was small and anteflexed, but retroposed, reclining in the hollow of the sacrum.

At her next visit she thought that she must be pregnant, as she had felt slight movements. I then did not feel the uterus so clearly, and, disregarding my first find, thought that I must be dealing with a case of extreme anteflexion of a pregnant uterus.

On the 16th of December, a month after the last flow, she had a slight bloody discharge without pain, and again, on the 12th of January, she had a free, colored discharge lighter than her normal menstruation. On the 8th of March she had a free flow lasting five days. My note on the 13th of March states: "Uterus is small, low down in the hollow of the sacrum. On

raising the finger to the anterior vaginal wall an ovoid, tense cyst is felt on the right side, about 12 cm. in length by 7 cm. in breadth. The axis of the cyst lies in the plane of the superior strait; its anterior extremity lies at the symphysis pubis to the right, and its posterior extremity is at the right cornu uteri. A

Fig. 3.

Fœtus of case of unruptured extra-uterine pregnancy, drawn life size from memory.

well-defined sulcus lies between tumor and uterus, which are connected by a short but recognizable pedicle. The tumor is sensitive to pressure. It is very smooth, and has a remarkable elastic feeling; there is much tenderness on the left side, low down, where there is an indistinct worm-like feeling about the retroposed fundus uteri." The tumor, when first seen, had extended out of the pelvis half way up to the umbilicus, and

had very markedly diminished in size while under observation. The diagnosis of an extra-uterine pregnancy was positively made and invitations were sent out to Drs. H. P. Harris, Charles H. Thomas, Paris G. Clark, Hunter Robb, and Walter C. Freeman, to be present at an operation for extra-uterine pregnancy. The operation was performed on the 20th of March, 1886, resulting in the removal of an unruptured sac arising about the middle of the tube. The patient recovered, and I have attended her in a confinement since then.

Fig. 4.

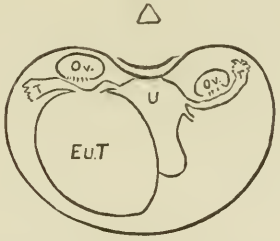


Diagram of relations of unruptured extra-uterine sac in Dr. Kelly's case—diagnosed and operated upon before rupture.

It is always safer when a diagnosis is doubtful to assume that the worst of a given number of conditions under consideration is present, until we have with certainty excluded it. Therefore it is best to assume, in a doubtful pelvic condition carrying some of the marks, that an extra-uterine pregnancy exists, until we have proved the contrary.

Another case which I had under treatment at the same time as the one just reported, was also seen by Dr. Harris, and a positive diagnosis of a ruptured extra-uterine pregnancy made. This woman refused operation, and after passing through a period of much suffering, and several attacks of internal bleeding, recovered. The sac, which at first, in February, 1876, filled the pelvis, crowding the uterus forward behind the symphysis and extending nearly up to the umbilicus, diminished rapidly in size until in the middle of April, when the note states that the uterus was normal in shape, anteflexed, with a softish mass just behind it, which might easily escape detection. Dr. Harris and I both considered this to be a case of spontaneous cure.

I had a case recently in the Johns Hopkins Hospital, in which the diagnosis of an extra-uterine pregnancy was positively stated in the presence of thirty-two spectators, and the operation at once proved the diagnosis. I went so far here as to say, as I took up the knife, that I had insisted upon the possibility of diagnosing some cases with certainty, and if this should not prove to be a case of extra-uterine pregnancy, I would not again contend that it was in any case possible to diagnose the condition with certainty. A fully-developed fœtus, which had escaped from a ruptured tubal pregnancy on the right side, was removed from among the intestines.

I think we can be positive of our diagnosis when we have these symptoms: 1. Cessation of menstruation, often followed by irregular recurrence. 2. Pains in the lower abdomen, sometimes severe. 3. The presence of a tumor, to the right or left of the uterus, which sometimes fluctuates. 4. An enlarged uterus (we do not always have this). 5. Discharge of the decidua, which is very characteristic, but not always formed. 6. Milk in the breasts, a very important symptom, especially in a primipara, and 7. A sign rarely found, the diminution of the tumor while under observation—a pathognomonic sign if there is one. I had this last sign in my cases; it of course implied the death of the fœtus.

Those cases are positive where we get all of these symptoms.

There is yet a class of cases, where we get some of these symptoms, but there remains a doubt, big or little according as more or less of the major signs are present; then there are other cases in which none of the symptoms are present, but the disease is found out by an accidental examination, or a sudden death.

Treatment: Undoubtedly many cases recover spontaneously. The larger majority of hæmatoceles are of this origin. If I were dealing with a freely-movable extra-uterine tumor in the abdomen, my preference would be laparotomy. It is as simple as removing a small ovarian cyst. If, however, the tumor has developed into the broad ligament, the operation is sometimes one of great difficulty, and I would not blame the man who would first use electricity in the early months, and await the results, ready to operate later if need be. It is important to

bear in mind the fact that the use of electricity does not at all exclude other plans of treatment; a laparotomy can be performed at any time, but we cannot say *vice versâ*.

Is the fœtus so important? I would not consider the life of the fœtus for a moment, but would act as if the fœtus and its sac were a malignant foreign body. Never consider it or let it weigh a feather if by its sacrifice you can add to the chances of preserving the life of the mother. If I had a living fœtus at term I would open the abdomen and study my field. If the fœtus were found, as in the case operated upon by Dr. Robb, within an unruptured tube along with the placenta, the whole could be removed with ease and two lives saved. But if the placenta were found attached to the intestines the dangers of subsequent hemorrhage and death from the detachment are so great that I would detach the fœtus, dropping the funis back into an aseptic abdominal cavity which I would then close, later performing a second laparotomy if the indication arose. It is a maudlin sentimentality which weeps over the life of an extra-uterine fœtus in the early months.

I have not space here to speak at length as to the deformities of these "tube-casts," as they have been called.

Dr. Hunter Robb, of Baltimore.—I have listened with a great deal of benefit to the papers which have been discussed. In regard to the pathology of fecundation, it would seem to me that the tube is primarily the most frequent site, although ovarian pregnancies do take place. In order to determine, however, whether the sac is ovarian or not, as Dr. Jaggard has said, the only sure method is microscopical examination. In my own case last winter the ovary was not to be found anywhere, and at first it seemed like ovarian pregnancy. Upon microscopical examination of a portion of the sac we found nothing but ovarian tissue. On examining other portions we saw the muscular tissue of the tube, and in this portion the ovary was adherent like a part of the sac. This would probably have been mistaken for ovarian pregnancy if it had not been carefully worked out.

As to the diagnosis, it seems to me if we said that we could not make a diagnosis of extra-uterine pregnancy, we might as

well say that a diagnosis of a fibroid or parovarian cyst could not be made.

The first case that Dr. Kelly reported was one about which he not only wrote to me in Philadelphia in 1886, but in which he also invited me to the operation and stated positively that it was a case of extra-uterine gestation *previous to rupture*. The second case reported by Dr. Kelly last winter was operated upon after rupture. Dr. Osler asked me to see it in consultation in one of the wards. I made a diagnosis of extra-uterine gestation, and Dr. Kelly confirmed the diagnosis and stated in the operating-room that it was undoubtedly an extra-uterine fœtation, which was so proved by the operation.

As regards treatment, I believe that the only rational method is operation by abdominal section, and I do not think there are any reasons to assume the responsibility of delay in using electricity.

Dr. Joseph Taber Johnson, of Washington.—In the recent paper of Dr. Hanks's, read before the Society he gives the history of eleven cases of his own and his conclusions, and states that the diagnosis ought to be possible in ninety or ninety-five per cent. of all cases, and he recommends electricity in the beginning and operation afterward if necessary. He thinks electricity will kill the fœtus and that in all cases of rupture the operation should be done at once.

Dr. Kelly.—I would like to hear from Dr. Buckmaster, who has had considerable experience, especially with the electrical side of the question.

Dr. A. H. Buckmaster, of New York.—I will say but a word in regard to the subject. In the cases where we have the choice of electricity or operation, we must compare the results obtained by fœticidal agents that do not directly remove the sac with those that do. Of the former class clinical experience shows that electricity easily stands at the head of the different methods. It would be a fatal blow to the use of this agent could it be proved that it does not accomplish the main object sought, namely, the destruction of the fœtus. Dr. Baldy, of Philadelphia, who thinks that the electrical treatment may not be effective, recently quoted a statement of mine that I had used

a current of twenty milliampères through a pregnant uterus, without affecting the life of the fœtus. Electricity was applied in the way he stated, but the conditions were not such as to make it a case to be quoted against the use of electricity, for two reasons. There was a large fibroid tumor present. The electricity was passed through this tumor, and the law of the intensity of the current is that it is greatest in a direct line between the points of the electrodes. There is a point within a few inches, at right angles to this line, where the current-strength is slight, and the fibroid was large enough to make the current, which was very weak, of no practical strength outside of the direct line, which was some distance from the ovum, so that the case quoted amounts to nothing in support of his views. Secondly, we must remember that a fœtus inside of the uterus is under different conditions from one situated in the tube, and it would be unfair to assume that a current which did not destroy the fœtus in the uterus would not have destroyed it in the tube.

Dr. J. A. Temple, of Toronto.—I am very sorry that I was not present this morning, as I would like very much to have heard the discussion on ectopic pregnancy. Dr. Mann has asked me to mention a case on which I operated recently. The patient was a woman, thirty-six years old, had had three children, the youngest of whom was fifteen years old, and had not been pregnant since her last confinement. In the early part of July she missed her menstrual period, but she did not pay any particular attention to it and did not call in any medical adviser. She missed the next period in August, and during July and August she had, while in Toronto, two very severe attacks of violent pain in the region of the uterus which was supposed to be colic and was treated with castor oil and warm fomentations. She went away to the Muskoka regions during August and while there had a third similar attack, very severe in its character and followed by profuse hemorrhage. Dr. Sutton, of Pittsburg, happened to be in the hotel and saw the lady, and after due deliberation he concluded that it was a case of tubal gestation, and he sent her to Toronto where she fell into my hands, although I am not her regular medical attendant. She was weakened from loss of blood, but complained of

no pain. Examination revealed very clearly that it was a case of extra-uterine pregnancy, there being a tumor about as big as a hen's egg, very smooth, lying posterior to the uterus, which was pushed forward to the left side. I recommended, as Dr. Sutton had already done, that laparotomy be performed without any delay. The friends consented and I operated upon her. On making the opening into the abdominal cavity, I found low down in the pelvic cavity behind the uterus this mass which was adherent, and the adhesions were tolerably firm. Previous to the operation we thought that perhaps it was seven or eight weeks' gestation. However, I was fortunate enough to remove the tube on the right side without rupture. There was no particular difficulty in the operation; there was a little free hemorrhage following it, which was controlled by the use of hot water. The patient made an uninterrupted recovery and on the sixth day I removed the stitches, when the wound was healed. Her temperature did not exceed at any time 101°, the general range being about 99°. On the eighth day she had a very severe attack of mania, which continued for three days in spite of all our efforts to control it. She talked day and night incessantly. On the twelfth day she became semi-comatose, did not recover consciousness, and died on the twenty-third day, perfectly insensible. There was no albumin in the urine during convalescence; she passed an abundance of urine, and the bowels acted of their own accord. There were no symptoms of paralysis. I fed her with a stomach-pump for eleven days. I did not attribute her loss of speech to the result of the operation, as I think was clearly proved by the course and progress of the case. I would be glad if any one present could tell what was the cause of death. I might say that when I applied the stomach-pump she would draw up her knees and hands, as if trying to prevent the operation, though at all other times she was apparently insensible. It might be argued that this was not a case suitable for operation and if some other plan had been pursued she might have been saved, but I am persuaded that operative procedure was proper in her case, and that the patient did not die from the results of the operation, from septicæmia or any similar disease, but rather from some cerebral complication.

Dr. Mann.—I said my say this morning, and I do not know that there is very much more to be added. Perhaps to what I said in regard to the specimen which I presented two years ago and which Dr. Johnstone doubted, I may add this: The doctor has thrown some doubts on the question as to whether my specimen was an ovarian pregnancy, questioning the true placental nature of the mass which was taken from the inside, thinking that it might be an adenoma or adenoid growth. I cannot admit that it was not distinctly and absolutely placental tissue. Under the microscope placental tissue is so different from adenoma that I do not see how anybody could make a mistake. In the second place, it was not attached to the inside of the tumor. When I opened the sac, the walls of which were very thin, this mass separated and fell out, a perfectly round cake of placenta, entirely different in every way from the adenoid growths to which the doctor has referred. He says if it was ovarian pregnancy where were the sinuses and bloodvessels which should have been in the sac? I will simply say we had no history. The specimen was taken out post-mortem. Supposing the fœtus to have been dead for some time, as was probably the case, all the sinuses would be closed, for the placental circulation would be cut off. I cannot, therefore, believe that it is anything but an ovarian pregnancy. The specimen in Gottschalk's case was presented to the Berlin Society and contained all the characteristics of a fœtus in the ovary, the tubes being intact. I have not changed my mind after what I have heard here to-day, and I still hold to the electrical treatment in properly-selected cases, but of course some cases should be operated on, as I indicated in my paper.

Dr. Johnstone.—This is just as I expected it would be—"convince a woman against her will;" the repetition of the proverb has been carried out here to-day. I knew that this discussion would convince nobody, but it has resulted in freely opening up this question and bringing out the ideas of the different members, and I am glad to see that in getting down to the bottom of the electrical treatment its friends certainly are not so confident as they once were. We all mean to avoid

acrimonious discussion, but sometimes in the heat of debate we say things that we do not mean.

I do not believe that electricity is an agent to be used, and I believe fifteen years from now it will be looked on in just the same light as tapping cysts and meddling with pelvic troubles are now—in other words, our rule will be to let the tumors alone until we take them out.

In regard to Dr. Mann's specimen, I did not say that it was an adenoma. I said that it was more like the tissue of the mucous follicles. Three or four years ago I read a paper before a society in Kentucky on "Papillomatous Degeneration of the Ovary," stating that it is like the adenoid tissue of the lymphatic gland. In the ordinary sense adenoma means a gland tissue, like the liver or kidney. I do not mean any such thing as that; I mean that it is a mucous tissue, and it is utterly impossible to differentiate between that and the mucous tissue in the ovary and the placenta. As for the fœtus becoming detached, I have had the same thing happen to me with dermoids. In one case I found, post-mortem, a tumor which had existed for more than twenty years. Three or four children had been born during the existence of the tumor and the woman lived to a ripe old age and died of dysentery. In one ovary I found a well-formed upper jaw and in the opposite ovary the very thing Dr. Mann is talking about; whether it was adenoid tissue of a lymphatic gland, or one of these mucous affairs I cannot say. At any rate, we cannot rely upon these specimens unless they are fresh.

I am not foolish enough to say that there is no such thing as ovarian pregnancy; all I can say is that those which I have seen have not been ovarian pregnancies according to my belief, and until we can see them fresh I do not believe that we can prove that there is such a thing as ovarian pregnancy.

There is one other point which has been raised by Dr. Kelly and a number of others this morning as to the diagnosis of extra-uterine pregnancy. The only time at which it has ever been claimed that the diagnosis of extra-uterine pregnancy is uncertain is before rupture. After rupture it can be made very well, but it is before rupture that we claim uncertainty, and it is just on that point that the electrical treatment turns. The electricians

claim that they can make it before rupture; they would not pass a current through the rupture into the peritoneal cavity, and then they resort to the knife, but in that class of cases of which Dr. Mann spoke, in which they do use it, where there is rupture into the broad ligament, where the hemorrhage is controlled by the pressure of the folds of the peritoneum—those are the cases which as a rule result in a cure. May it not be possible where the current is used in this way that the fœtus is killed by the accident instead of by the current, and if let alone would do just as well without the electricity as with it? I have a case now in which I believe that this very condition is going on. The patient claims that this is the third attack of the kind within the last five or six years. She has been sterile for eight or nine years, and in the last few years she claims that she has had three blood tumors; one which passed through the uterus, a second passed away through the bowels, and now here is a third, and if that be true, am I not at fault to allow that woman to go on with that diseased tube? I claim that with electricity we leave our patient very little better than when we found her. She is subject to all the recurrent evils of pelvic disease, and the only way to cure her is to clean them all out the same as with any other pelvic inflammation, and before her powers are exhausted. Another strong objection is found in the errors of diagnosis from its use. If you will excuse me I will report two other cases. Year before last I kept my laparotomy bag packed for two weeks, expecting every moment to have to operate upon what would be a ruptured tubal pregnancy. If there is such a thing as diagnosis before rupture, I made it. There had been no rupture and no shock, but I was constantly expecting it. One night after a terrific attack of pain the patient became easier and the next morning instead of the lump being on the side of the uterus it was in the body. I think that it was one of those very rare cases of intra-mural pregnancies which was forced into the cavity of the uterus. The woman went on to term and was delivered of a fine boy. What would have been the result of electricity in that case?

I saw another case in which I thought that the woman had a fibroid. The patient had been married twenty years and had

never been pregnant, but at my second visit I corrected my diagnosis and concluded that it was a ruptured extra-uterine pregnancy. I suggested laparotomy, but they would not allow it. The tumor was then aspirated by her attendant and the woman bled to death from hemorrhage into the broad ligament. We certainly should not stand back and fold our hands and lose these patients. I think the result would have been the same in this case if electricity had been used. As I said before, I believe that in all these cases the only thing to do is to take them out as quickly and cleanly and smoothly as we can possibly do it.

One other point in the technique of extra-uterine pregnancy. Unless you are sure of hemorrhage going on, you had better wait for the shock to be over, although I have seen some get well with the hemorrhage going on. My first case got well after rupture; there was a very slight hemorrhage going on, but the patient recovered.

I saw a case in Mr. Tait's practice in which the woman almost bled to death. Her abdomen was full of blood. The whole gestation sac, tube, and ovary, was not bigger than my little finger, but a little opening in the side of it was almost enough to cause her death. By quick action Mr. Tait went straight to the point and ligated it, cut everything away, washed out, and for twelve hours you could scarcely feel the woman's pulse, but she recovered. So you can rarely say it is too late.

In regard to the point raised by Dr. Temple, in reference to mania in connection with these cases; this patient of whom I spoke, who bled to death from the aspiration, had violent mania all the way through. This is the only case of extra-uterine pregnancy in which the diagnosis was made after rupture, when the patient had puerperal mania and died from the shock of the hemorrhage. This case may have been simply the ordinary mania which follows laparotomy. I saw one patient who died in a similar way to the one of whom the doctor speaks, after the removal of a cyst of the broad ligament; after the tenth day the patient went into violent delirium and died. What it is due to I cannot say; whether or not it is a disturbance of the balance of circulation, or whether the brain is weakened by hereditary taint. It would be very interesting if the Fellows of this

Society would trace all the histories of cases of mania following laparotomy and see if they could not find a bad family history of hereditary mania. The only one I ever had did have it to a marked degree.

Dr. Edward W. Jenks, of Detroit.—I do not wish to prolong the discussion, but to refer briefly to a case which recently came under my observation. I was called in consultation the 23d of July last to see a patient who was moribund at the time of my visit. After hearing her history and making an examination I declared it was my opinion that this was in all probability a case of extra-uterine fœtation, in which opinion the attending physician concurred. The patient died in a few hours and a post-mortem examination was permitted upon the promise that anything found within the body must be returned to be buried with it. I was never more strongly tempted to break a solemn promise than in this instance. On examination it was found that there was a large quantity of coagulated blood within the abdominal and pelvic cavities, and very soon after a two and a half or three months' fœtus was found floating among the intestines on the left side. After removing the blood we were surprised to discover that this was a case of ovarian pregnancy of the right ovary. The appearance of the ruptured ovary was quite striking, it was as if the fœtus had been developed in the centre of the stroma of the ovary and where the rupture had occurred it was like the sudden bursting of a bud. The placenta itself could not be found, but we could see where we thought it was attached. As there was no opportunity of taking the specimen away, consequently no microscopical examination could be made to determine its exact site. This rupture, or at least a partial rupture, had occurred, as near as we could tell, about two weeks before and the woman had bled to death slowly drop by drop, as it seemed, instead of suddenly, from the copious hemorrhage which usually takes place in tubal pregnancies. She had been thrown from her carriage a fortnight before and immediately after severe pain with faintness indicated the time of rupture. These symptoms continued with more or less severity at intervals until her death. She had had no competent medical attendance until a few hours previous to my first visit.

If laparotomy would ever save the life of a patient in a case of extra-uterine fœtation, it would in this instance, if it had only been done a few hours before her condition was recognized.

Dr. Horace T. Hanks, of New York [Communicated subsequently].—My experience in connection with ectopic pregnancy has been considerable and quite varied since my paper was read before this Society at its meeting in Washington in 1888. I have seen nine additional cases, each well marked, and each interesting, thus making in all eleven cases seen by me in four years.

Case I.—(Reported in my first paper, see *Transactions*, 1888.)

Diagnosis.—Tubal pregnancy, left side, of eight weeks' duration. Diagnosis confirmed by Drs. Thomas, Talbot, and Abbott. Faradic current, used before a decided rupture or severe hemorrhage took place. Ovum diminished in size, and parts relieved of pain from the beginning of treatment.

Result.—Patient did well for over one year. Then a tubal cyst developed at seat of former trouble. Diagnosis confirmed by Drs. Thomas and Abbott. Major operation refused; three pints of fluid drawn off through small trocar *per vaginam*. The cyst, on July 15, 1890, four months later, had not refilled. The patient was robust and free from pain at this time.

Case II.—(Also reported in my first paper.) Diagnosis confirmed by Drs. Lee, Abbott, and Talbot. Faradic current used before the seventh week of pregnancy in the right tube; ovum ceased to grow after the first *séance*, and the pain and tenderness diminished, as did the size of the tumor. Two years later patient in robust health, a small induration at the site of former tumor not tender; menses regular. Not pregnant since.

Case III.—Mrs. F., wife of a prominent lawyer, has been under my professional care for twelve years. Diagnosis of tubal pregnancy on the left side was made in January, 1889, which was confirmed by Drs. Talbot and Abbott, and was believed to be correct by Dr. Lee, who saw her once and only for a short time. Had had two miscarriages in three years, and uterine and cervical catarrh with retroversion. Six months before this sickness, I had done a trachelorrhaphy. Had had most excellent health otherwise. Pregnancy believed to be of six weeks' duration. Faradic

current used, tumor diminished in size, and pain entirely relieved after treatment was begun. Only a small induration remains, and this is not sensitive. The patient is free from pelvic pain, and is in perfect health at the present time, September 10, 1890.

Case IV.—Mrs. B., wife of a physician, married less than six months; always regular up to the time of cessation of menses, six weeks before. Had enjoyed excellent health. Had passed one period without show. Had severe, unbearable pains in the region of the left ovary for several days. A tumor, characteristic of tubal pregnancy, was discovered by her husband. Later I was called in, just after another severe attack of colic; her husband informed me that the tumor had changed its situation, shape, and density.

From the subjective and objective symptoms, I believed that the ovum had been pushed out or through the fimbriæ into the abdominal cavity. Evidence of but slight hemorrhage internally. No immediate surgical operation seemed to be demanded, as I believed that the fœtus was dead, and the husband was anxious to avoid abdominal section if possible. A strong faradic current was applied once daily for six or more days. Tumor gradually diminished in size and was less painful. The patient, however, has suffered much since from pelvic pain in this region. I believe the exudation around the tube and ovary is the cause of the pain. Electricity is a comfort to her even now, and has often been resorted to. A major operation may yet be required.

Case V.—Mrs. M., from Texas, mother of several children, entered the Woman's Hospital with the history from her family physician of ruptured tubal pregnancy some weeks before. My examination and her own history confirmed this. The tumor was distinctly felt in the region of the left tube. Abdominal section was advised and was performed by me in the hospital. Left tube exhibited evidence of having been ruptured and contained a full half pint of very dark blood. Much exudation about the tube and ovary on the left side, the other ovary and tube fixed less firmly; all were removed. The patient, I am informed eighteen months later, is in perfect health.

Case VI.—Mrs. D. (see *American Journal of Obstetrics*, 1890, p. 92) came from Chicago to consult me for pain and tenderness in

the pelvic region. Had a very severe attack during her journey East. I saw her on her arrival and realized that there was serious pelvic difficulty, and did not prolong the examination as I was sure of either a ruptured tubal pregnancy or a ruptured pyosalpinx. An abdominal section was advised at once and was performed by me on the following morning. A ruptured right tube was found, and the lower part of the abdomen was literally filled with blood. She recovered rapidly and was on the street in four weeks. One month ago her husband wrote me that his wife was in better health than she had been for five years.

Case VII.—Mrs. G. entered the Woman's Hospital September, 1889. The subjective and objective history led me to believe she had had chronic vaginitis during the previous year. She was not unwell the first month in the hospital. Later, she began to show evidence of pregnancy, and a little later she had intense pelvic pain with all the characteristic symptoms of internal hemorrhage. I operated, assisted by Drs. Talbot and Coe, and the house staff. I found a large ruptured tube on her right side, and a hæmatoma on the left. On the right side the rupture had been downward into the broad ligament, and in order to remove the blood-clots the broad ligament was opened for full three inches. This was the most difficult operation I ever attempted. Patient recovered.

Case VIII.—Mrs. H., entered the Woman's Hospital October, 1889. She had a large blood tumor in the left broad ligament. She gave the typical history of tubal pregnancy. The rupture had taken place two weeks before. She improved rapidly with simple palliative treatment. She was not willing to submit to a major operation. She went home much improved and quite happy at the end of four weeks. The tumor had diminished one-half. September 1, 1890, the tumor had not fully disappeared and it still gives her some trouble. A major operation has been advised if she does not improve under the use of electricity.

Case IX.—Mrs. S. I diagnosed a ruptured tubal pregnancy on the left side, in March last; Drs. Lee, Talbot, and Abbott confirmed my diagnosis; operation submitted to, and a ruptured left tube and ovary removed. The patient made an uninterrupted recovery and is in perfect health now.

Case X.—Mrs. —— (see *American Journal of Obstetrics*, 1890, p. 769). Patient, fourteen days pregnant, was seized with intense pelvic pain at 10 o'clock P. M. The family physician was called and gave her an anodyne. The pain was more intense in the morning, and the physician was summoned again. Recognizing the gravity of the case, he called Dr. Lloyd, and later myself. I reached her just as she was dying from internal hemorrhage. At the autopsy the abdomen was found filled with blood and the left tube was ruptured.

Case XI.—Mrs. R., mother of two children, always a healthy woman. Her family physician, Dr. Froleigh, sent for me June 28th. I confirmed his diagnosis of ruptured tubal pregnancy; she had skipped her menstrual period fourteen days before. Dr. Froleigh believed that she was in a better condition than when he first saw her, and we decided to wait until morning before operating. She was better in the morning, I was informed, but later in the day the evidence of a fresh internal hemorrhage was so manifest that I operated, assisted by Drs. Froleigh and Talbot. I found a ruptured right tube and fully two quarts of blood in the abdomen. In spite of the great loss of blood the patient did well until the sixth day, when symptoms of obstruction of the bowels from peritonitis began and she died on the eleventh day.

Conclusions. *Etiology.*—I doubt if catarrhal salpingitis is the only exciting cause of this accident.

One of the eleven had had a possible specific vaginitis (Case VII.).

One of the eleven had had syphilis and had been treated by me for salpingitis—Case No. I.

One patient (Case No. III.) had suffered from bad retroversion, and had worn an Albert Smith pessary for many months. She had suffered from an extensive laceration of the cervix and I had done, six months before this accident occurred, a trachelorrhaphy. She had suffered from chronic endometritis, endo-cervicitis.

Five of the eleven (Cases Nos. II., VII., IX., X. and XI.) had been in excellent health and had borne children within one or two years of this accident.

One patient (Case No. X.) had a six months' child at the breast, and was in robust health when rupture occurred, followed by death the next morning.

Two patients (Cases Nos. IV. and VIII.) had never been pregnant before.

Two patients (Cases Nos. I. and V.) had been sterile for some years.

Anatomy.—Seven patients had pregnancy in the left tube.

Four patients had pregnancy in the right tube.

One patient (No. V.) had pregnancy in the left tube very near the fimbriated extremity.

Diagnosis.—A diagnosis was made in each case excepting No. VI. Here I was so profoundly impressed with the imminent danger, if an operation was not at once attempted, that I asked but few questions and made but a slight examination.

I believe, as I wrote in my last paper, that a good physician can be reasonably sure of his diagnosis in from ninety to ninety-five per cent. of his cases if the patient is fairly intelligent, and he studies the case thoroughly before operating.

Treatment.—Electricity will kill the fœtus if used before the third month of pregnancy, and before rupture. It is always safe for the patient. Trouble may result later. In Case No. I. a tubal cyst has developed. This may be coincident; I fear it is not, however. Electricity will hasten absorption and relieve pain, but will not cure the effects of a perimetritis resulting from a ruptured tube.

At any time before the fifth month, if a clear diagnosis is made, the *experienced* surgeon should remove the tube and its contents at once, by abdominal section. If a rupture has taken place, with the cataclysmic symptoms, the operation should be done at once, even by an inexperienced surgeon if a specialist cannot be secured.

There is one rule, which does not require to be followed in abdominal section, *except for ruptured tubal pregnancy.* It is this: "Have the broad-ligament forceps at hand, and when the abdomen is opened, *immediately* find the fundus and as quickly seize the ruptured tube at the horn of the uterus, and apply the forceps. Later, and at your leisure, clear the abdomen of all blood and débris.

Prognosis.—Electricity will destroy the life of the fœtus in the *un*ruptured tube, if it is resorted to before the twelfth week. It ought never to endanger the life of the patient.

An abdominal section, done by a skilful surgeon, *before* the rupture has taken place, ought to save ninety-five per cent. of all cases.

An abdominal section, done by a skilful surgeon, immediately after rupture, will save the large majority of cases; especially if the hemorrhage has not been profuse.

A few, a very small per cent., have recovered without operation, both with and without rupture of the tube.

Probably three-fourths of all cases up to twenty-five years ago died without having a diagnosis made.

Three of my eleven cases were treated by electricity before rupture and *recovered.*

One of these three has *developed* disease of the tube since.

One of these eleven was treated by electricity after slight rupture and hemorrhage. She improved, but is not cured.

One of these eleven entered the hospital after rupture, and refusing a major operation, received only palliative treatment; and went home, four weeks later, quite out of danger but not cured. She will require a major operation.

One patient died thirteen hours after rupture, and ten minutes after I arrived in her sick room.

Five of these eleven submitted to an abdominal section by me, and four recovered, Had I done the operation in this one fatal case (No. XI.) twenty-four hours earlier, she, too, ought to have recovered.

ON THE QUESTION OF AMPÈRAGE IN TREATMENT OF FIBROID TUMORS BY ELECTRICITY.

By Willis E. Ford, M.D.,
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I have been interested to observe in papers and in discussions reported in medical journals for the past two years, that whenever the treatment of fibroid tumors by electricity is spoken of, the kind of current used is not mentioned with definiteness. Apostoli speaks of currents of intensity, and this means, apparently, in France, currents of volume or ampèrage; though it is not believed that his batteries produce large volume, but, on the contrary, from the number of cells used, great voltage.

Another term which is frequently used nowadays is electrochemical cautery, as applied to that process of disintegration caused by the action of the galvanic current upon living tissue. Currents of high tension or great voltage are certainly not the best adapted for that process of separation or disintegration of fluids called electrolysis—unless, indeed, great resistance is encountered between the electrodes, when cautery may result. As a matter of fact, the resistance to the current in ordinary gynecological work is very small. A fibroid tumor that offers 300 ohms resistance is a very large one and a very hard one. The softer myomatous growths conduct easily, and 200 to 250 ohms is perhaps the average resistance. They are most satisfactorily managed by galvanism.

It has been clearly proved by experiments made by myself

and by the reports of similar ones made by others, that the real thing that happens when a current of electricity is passed through a fibroid mass, is the separation of the fluids in the mass and their re-formation into different chemical combinations which interferes with the nutritive processes of the growth. This disintegration of the fluids within the mass is apart from any local cautery result. I have seen fluid flow in considerable quantities from the electrode when there was no resulting slough. Of course only the alkaline fluid appears at the negative electrode within the uterus or against or in the tumor, and the corresponding acids must be absorbed mainly. The process of removal of tumors by galvanism, if at all successful, is accompanied by more or less systemic disturbance of the patient, and the explanation is found in this process of absorption and removal afterward of the broken-up detritus—not purulent—in the track of the current. So far as the cautery effect of an electrode is concerned, I fail to see how it should be more than local, and therefore much better than other forms of cautery.

I have watched the effects of the stronger currents of galvanism when the electrodes were in actual contact with living muscular tissue dissected up for the purpose in animals, and have seen the disintegration of the fluids take place and the muscle become palpably dryer and smaller under the operation. When such wounds were closed the animals resumed their accustomed habits and motions within a few days. Upon reopening the wounds originally made and examining the muscles operated on, there were found no sloughs and nothing in the microscopical appearance of the muscular fibre beyond a slight atrophy. This process cannot be described as galvano-chemical cautery, but must be looked upon as a true electrolysis.

It is well known that this process of electrolysis depends upon that element of the galvanic current called its volume or ampèrage. The voltage is necessary only to push this volume through the resistance. As has already been shown in

gynecological work the resistance is very small and, therefore, the current most effectual is one of large ampèrage with just enough volts to push it through. Practically, I have found this to be true in the dispersion of fibroids, and to a marked degree in the softer growths not wholly fibrous.

The term electro-cautery does not seem to me to apply to cases where no sloughs are formed, and especially where the electrode does not reach the point either of greatest resistance or the real objective point of treatment. Cautery of the endometrium cannot be all that is desired in the treatment of an adventitious mass which does not always enter into the uterine cavity. It is much nearer the electrical facts to call the process electrolysis.

Some time ago, having a rather large and firmly-attached submucous fibroid to remove, one which projected a little into the vagina, I pierced it with a platinum needle after the usual method of electrolysis by puncture, and sent through it a current of electricity such as I ordinarily use, recording upon short circuit beforehand twenty volts and six ampères. The milliampèremeter marked 80 during the operation. Two days later I removed the mass, and made sections in the long diameter of the tumor, which corresponded to the direction of the current. No cautery effects were observed, but a white, glistening track marked the current as plainly as lightning ever marked a tree. In its course, which was several lines in width, the tissue was paler and free from the fluids which could easily be demonstrated elsewhere in the mass.

In this fresh specimen something different from electro-chemical cautery was apparent through the entire length of the tumor, marking the direction of the current between the electrodes plainly. There is nothing in the theory that these applications of galvanism store up in the tissues some of the electricity, which slowly evolves into chemical force after the current is stopped. The fibroid is simply made a part of a circuit, and having greater resistance than the conducting wires, the electricity is at this point transformed into another

form of force—namely, chemical force. That there is a strong tendency on the part of fluids thus separated by electricity to reunite or re-form, and thus to generate again a feeble electrical current, is true. The very nature of electricity can only only be judged of by the work it will do. No mere theoretical considerations count for much when applied to this agent.

In observing the work that various kinds of electrical currents will do, I was surprised to find that a galvanic current from fifty small cells of a bichromate of potash battery giving about one hundred volts and one ampère would not deposit from a solution of cyanide of gold as much metal as would four one-quart cups giving eight volts and six ampères. Here was a current of tension pitted to do a typical work of electrolysis against a current of volume. In order that the conditions might more nearly approach those of actual gynecological electro-therapeutics, I recently took sixty-two cells of the small cup battery in common use, and measured its current, and found it registered 116 volts and $3\frac{1}{2}$ ampères, though it would not maintain this strength long. I placed a 350-ohm resistance-coil in the circuit and measured accurately the amount of electrolysis of a cyanide of silver solution that this current could do in eight minutes. I then took twelve elements of a larger-celled battery, but with the same fluid to charge it as in the other instance, and found there were 24 volts and 12 ampères registered. Introducing the same resistance-coil (350 ohms), I gave it the same work to do with fresh materials that had been accurately weighed. The milliampèremeter marked 150 during this experiment, and the time was the same as in the former one. Resistance of the coils in milliampèremeter, in the silver solution, and internal resistance of the cells not noted. The most careful weighing of the copper plates upon which silver had been deposited in each case failed to discover the one-thousandth part of a grain of difference in the weight of the deposit. Evidently voltage

is not necessary beyond a limited point for effectual electrolysis.

A striking fact regarding the ampèrage or current-strength was observed when recording the work done by a large-cell (and, therefore, large ampèrage) battery in contrast with a small cup battery. Both were new zinc-carbon, bichromate of potash batteries; the large cells held one quart of fluid, and the small ones two gills each. The large-celled battery in series yielded 11.2 volts and 14 ampères, which was used for ten minutes, the resistance in the external circuit plus that of the internal resistance and meter being exactly 300 ohms. The current-strength did not fall or vary during the sitting.

With small cells with the same voltage, but only 2.9 ampères, working through the same resistance, the ampèrage was not maintained one minute, but steadily and rapidly declined through the sitting. It can scarcely be doubted that generators which furnish small ampèrage can never give as satisfactory results as do those which furnish great current-strength.

Where an open-circuit battery is used, and a water rheostat is necessary to regulate the current, then this resistance increases the tension or voltage of the current in proportion to its volume, and so it comes about that nearly all operators are using intentionally or unwittingly currents of tension having small ampèrage. Ohm's law is always quoted in this connection, as showing that, no matter what sort of current you start with, as soon as resistance is interposed in the circuit the resultant is the same. Mathematically, this is true when all possible resistances are considered, but the gynecologist is dealing mainly with small resistances, and desires the chemical disintegrating effect of his current. If we could conceive of a current passing through its circuit without any resistance, then the ampèrage only of a current would be considered, and the work a battery would do would depend entirely upon this one element. The smaller the resistance

the greater the importance of this element of current, and for the chemical effect the voltage should be only large enough to overcome the resistance.

One objection to high-voltage currents is the pain they produce, and another is the danger of serious shocks if, from any cause, the current is interrupted during the *séance.* A twenty-volt current that has six to ten ampères volume is easily borne, and, while the milliampèremeter may not register more than 60 to 80, you are certain of better results than when using an eighty-volt current having only one ampère volume, unless you desire cautery effects.

If, therefore, we wish to cause the absorption of a pelvic exudate, or the dispersion or disintegration of a fibroid mass, a current of volume is necessary; but, if a large, hard fibroid mass is to be treated, a current of tension is necessary, as in any case where resistance is very great. For this reason peritoneal adhesions, which offer very great resistance, require currents of high voltage, but the softer masses that conduct more readily do not require the same kind of current. I call attention to this fact without illustrating it clinically, for the reason that many honest men are denouncing electricity generally because the quality of their currents has not been suited to their cases; and if a little attention is given to the electrical side of the question, the clinical results will, I believe, be better, and the opinions of men operating will be modified somewhat.

DISCUSSION.

Dr. Tremaine, of Buffalo.—I am very much interested in Dr. Ford's paper and in his clear statement of the difference between tension and quantity. As I understand it he made experiments with the action of the current on living animal tissue. Most of us who use electrolysis for the extirpation of fibroids employ an abdominal electrode and an intra-uterine electrode. I have treated sixteen cases of fibroids in this way, and I have never been able to obviate intra-uterine cauterization, even with

a very mild current, using upon the negative pole a little salt, the positive pole in the uterus, and regulating the current with a rheostat.

Now, I would like to ask Dr. Ford to explain to us, if the electrolysis goes on through the intervening tissues and abdominal walls, what becomes of them? I would like very much to hear an expression of opinion, as this question seems to be *sub judice*—that is, as to the real value of Apostoli's method of treating fibroids. I confess that after an experience in sixteen cases I am disappointed, although in some cases hemorrhage has been arrested and other benefits derived, and possibly a retrograde metamorphosis may have taken place, as we know such a thing does sometimes happen from other causes, and even spontaneously; although some of the unpleasant symptoms have been relieved in some cases, I have rarely, if ever, seen any diminution of the tumor itself.

Dr. Ford.—In the ordinary use of galvanism, according to Apostoli, the positive or indifferent pole conveys the current to the abdominal wall and is distributed by a very large plate, so that the condensation of the current is avoided, and this condensation only occurs at the point of the internal or chemically-decomposing electrode, the chemical decomposition occurring at the negative electrode.

So far as the stopping of hemorrhage is concerned, I must confess I have never seen very much benefit from the positive electrode over that of the negative. I presume I have treated very faithfully one hundred and fifty cases of fibroid tumors with electricity, and kept notes of them all, and I cannot stop a hemorrhage with a positive electrode in the uterus more quickly than I can with the negative electrode. I cannot stop it always. A hemorrhagic fibroid is a very hard thing to deal with, with electricity or anything else, and I think there Apostoli's method often fails. I do not believe a positive current at the bleeding point will regulate the bleeding unless it cauterizes.

Dr. Tremaine.—I understood Dr. Ford to say that he saw, in his experiments on living tissue, the separation of the fluids, and I do not exactly understand how that can take place in the fibroid and not in the other intervening structures and tissues.

Dr. Ford.—Electrolysis occurs chiefly at the point of greatest resistance to the current and at the point of condensation, and normal tissue is not appreciably affected under a large dispersion plate. A year ago I made experiments as to what these fluids were that appeared at the negative electrode. I caught in a spoon speculum a quantity of the fluid at several sittings, so that I had sufficient for a pathologist to examine carefully. It was an intensely alkaline fluid, having a strong chlorine smell. With a current of large enough volume like the one I employed a few days ago, where a gentlemen was in doubt as to whether he would see the actual process—a battery of about fifteen of these large cells with an ampèrage of about 10 A., we saw the vagina bubble full of it, and it ran out over my instrument and I caught it and showed it to him. This will occur in three minutes, if the current has sufficient ampèrage. Of course, over the large plate, if you test it afterward you will find it is slightly acid, but the current is distributed over so large a surface that no chemical cauterization takes place. When I first used electricity I often blistered the abdomen with my abdominal electrode, but I never have that trouble now. I use a large plate of copper covered with punk, which seems to me to be better than the clay electrode of Apostoli. These plates I have of all sizes, large enough to cover the entire abdomen. The battery which I use is a modification of the simple bichromate of potash cell, the zinc plate being very large, and on each side of the zinc plate is clamped the carbon.

Dr. Henry P. C. Wilson, of Baltimore.—What electrodes does the doctor use in treating fibroids in the cavity of the uterus?

Dr. Ford.—I have used the blunt end of Apostoli's needle, a pure platinum needle, one end of which is like a uterine sound. I have had some gas-carbon electrodes made recently, but they are very difficult to get. I make my own electrodes by taking a piece of brass wire and having hammered on it thin platinum foil, as the platinum plating is of no use. By this means I can make the electrode of any shape, and the platinum never comes off, or corrodes, or does any harm. I think that platinum is the

only thing that should ever touch mucous membranes, excepting perhaps the gas-carbon.

Dr. A. J. C. Skene, of Brooklyn.—The doctor has raised many questions that we are interested in. I am sure that I am more interested than well-informed on this subject. The field of electro-physics has always been somewhat obscure, and I do not know that I clearly comprehend him, but I believe I am right in saying that Dr. Tremaine's question remains to be answered. If I am mistaken in that, Dr. Ford will correct me.

First, I have no doubt that the abdominal walls and the intervening tissues between the electrode and the fibroid are also acted upon—that is my impression. I have no doubt there is a certain degree of electrolysis going on in the intervening tissue as well as in the tumor, and the reason why the tumor disappears and the abdominal walls and other tissues remain, I believe to be this: The fibroid tumor is of a lower vitality than the other tissues; it is more susceptible to decomposition, and electrolysis I conceive to be a form of decomposition. Highly-developed tissue resists electrolysis more than the fibroid, and even if it does sustain a certain electrolytic action, the tissues react and regain their original condition while the fibroid does not. This explanation I have accepted as being the answer to the question of Dr. Tremaine. If I am wrong in that, I wish Dr. Ford would correct me.

As to the process of electrolysis, I have always understood that it was nothing more or less than the decomposition of the fluid of the tumor or tissue into hydrogen at the seat of the negative and oxygen at the positive pole. What becomes of the tissue after the fluid has been decomposed in this way and separated into its elementaary principles, I do not know. Beyond that I do not think we thoroughly understand the changes in the tissue. This change in the fluid of the tissues, however, is all that is necessary to lessen the nutrition of the fibroid, and consequently if not to diminish its size, at any rate to arrest its growth. I believe that to be the fact, at least that is the way I have looked at it, so that that would give us an idea of its action and also of the manner in which it affects fibroids.

I am very glad that Dr. Ford brought out the difference

between electro-cautery and electrolysis. I long ago satisfied myself that cauterization to any extent is not necessary in order to stop the growth of the fibroid, and in many cases to reduce its size. I think it is a mistake ever to use the current to a degree or to use the kind or quantity of current that would produce cauterization, unless to arrest hemorrhage. It is not necessary, and when we avoid it we avoid all the dangers of electrolysis, and that is a very important matter. I think that is the view which is now accepted by the practitioners in France. I am unable to recall the name of a French physician, but he is a distinguished one, who has used electrolysis in fibroids and who stated that he had never found it necessary to produce cauterization in order to get all the typical effects. Again, I think this answers another question raised by Dr. Tremaine in regard to cauterization. In regard to the proper electrode I would differ from Dr. Ford; I have never found anything equal to the clay of the Apostoli electrode. Dr. Ford said it was "dirty." I think it is the cleanest thing we can find if managed properly, but as I use it for artistic purposes you may perhaps say that I am biassed in that respect.

Now, if we use the positive electrode in the cavity of the uterus, from the very nature of electrolysis you will get a certain charring of the tissues which may approach cauterization, and sometimes we get stenosis if we practise electrolysis with the positive electrode in the cavity of the uterus and use a strong current. I think all that is avoided by using the positive electrode on the abdomen and the negative in the cavity of the uterus. I have never seen cauterization nor anything approaching to it when I used the negative electrode in the uterus with a large positive electrode on the abdomen. But suppose that stenosis or stricture should occur, it can be easily relieved. In fact, electrolysis is a recognized treatment for stricture.

Dr. Tremaine.—I asked the gentlemen to state their experience, as this seems to be one of the active questions of the present day. How many cases of fibroids have been cured by Apostoli's method? I have never seen one myself out of sixteen in my own experience and that of other gentlemen, and I would like to know whether my method is at fault, or any cases are really

cured. I would be inclined to credit a statement made by Dr. Skene, or any of the other gentlemen here, more than I would Apostoli's.

Dr. Skene.—The answer to that question will entirely depend upon what we are to understand by cure. If we mean the entire disappearance of the fibroid, I have never seen more than two cases in my own practice, and one or two which Dr. Tremaine would doubt a little, perhaps, in the practice of others, where the tumor disappeared entirely. If he will accept the limited use of the expression "cure" to an arrest of the growth of the tumor, and relief of all the symptoms, then I have seen a large number of cures. "Symptomatic cure" is an expression we hear now-a-days, and it is a good one, and expresses the results obtained. I am unable to give you figures, but if you will take my word for it, I have seen a large number cured in that sense. If you refer to the work of Dr. Keith, in which he gives a careful report of two hundred patients and over treated by himself and his son, Skene Keith, you will find a very large number, I think about seventy per cent., cured in the sense of the patient being entirely relieved and the tumor arrested in its growth, and in the majority of cases very much diminished in size.

Now, after what Dr. Tremaine said, I would like to say that I would accept Dr. Keith's statements quite as soon as those of Apostoli, but I would say here, in justice to the distinguished Frenchman, that you must all remember that any man who makes a discovery such as Apostoli did becomes an enthusiast, and when he describes his children he is apt to endow them with a little more color than they show to other people. I believe Apostoli intends to be very honest, but he has probably seen his work somewhat through a magnifying-glass. It is nothing more than we should expect of an enthusiast, especially one who has done such good work as Apostoli. I think, in the main, he is correct. Recently, I believe, he has changed and improved very much his views, and that is a sure sign of a true scientist, and should increase our confidence.

Dr. Wilson.—I asked Dr. Ford what electrode he used in the cavity of the uterus in cases of bleeding myoma, for the reason that I have used electricity a great deal in such cases.

Some time ago, while I was in Paris, Dr. Apostoli was kind enough to procure for me one of his batteries and electrodes. In the ordinary application of galvanism I use the platinum electrode in the cavity of the uterus, excepting where I have bleeding myomas, and in those cases I use carbon electrodes, of which I have about a dozen sizes, and it makes the most wonderful difference in cases of this kind whether you use the platinum electrode or the carbon electrode. I remember very distinctly seeing, a year or more ago, a woman who had a great deal of trouble with a bleeding myoma. There was nothing left but to perform hysterectomy, or, if possible, control the hemorrhage with electricity. The patient could not bring her mind to consent to a hysterectomy, and I was not prepared to do it. I curetted the uterus again and again, and followed it up with all sorts of treatment, and the hemorrhage would be controlled for a time, and return just as often, but I finally succeeded in controlling it perfectly, and I cured the woman by the use of carbon electrodes of different sizes in the interior of the uterus, with a positive current. It has now been two years since I treated her, and when I heard from her not long ago she said she had had no recurrence of the hemorrhage. I do not suppose the fibroid is entirely gone, but she is a comfortable, useful, and well woman. I do not care a particle whether the fibroid is there or not, so long as I have made her useful, comfortable, and happy.

Now, Mr. President, the benefit to be derived from the use of electricity in treating fibroid tumors depends a great deal upon the kind of fibroids to which we apply it. If we have an intra-uterine pediculated myoma we will get little or no good from electricity. There is nothing to be done but to remove the myoma. If we have a subperitoneal pediculated fibroid, and use electricity, we will get little or no good from its use. If we have a soft or œdematous fibroid of the uterus, and use electricity, we will get no benefit to that myoma; it will rather grow than diminish.

But if we have an intra-mural fibroid, or where the tumor is three-quarters to four-fifths embedded in the walls of the uterus, and we use galvanism, I believe that in a large majority of cases

we can cure that patient, in the sense referred to by Dr. Skene. I believe that where the myomata are very large we rarely see them disappear altogether; but I believe, from my experience, that we can so stop the growth of these tumors, so diminish their effects, so reduce their vitality, that the woman will be a comfortable woman, a useful woman, enjoy life, and attend to her duties just as much as if she had no remnant of the fibroid remaining there.

I was in Paris this summer, and saw a good deal of Dr. Apostoli. His clinic was crowded with men and women from all parts of the world. On one occasion a woman came in with a very large tumor. She looked as if she was pregnant, and all ready to be delivered. He called me, and asked me to examine the woman, and give my opinion as to what kind of a tumor it was, and what I thought of electricity in the case. I examined the woman, and made up my mind that in the first place it was a uterine tumor, and second, that it was a soft œdematous myoma. I gave him that opinion, and said to him, "There is one thing I can tell you certainly—that you will never do that woman any good with electricity, and I think it will do her harm." He smiled, and said, "What makes you think so?" I said, "I will ask you one question: How long have you been attending that woman?" He said he had attended her for about three months a year previously. She had then disappeared, and recently came back for treatment. I asked him if it was not larger now than twelve months before, and he said it was. I told him that was my experience in America—that where I had a soft œdematous myoma I rather did the woman injury than good by using electricity. I believe, as in all new methods of treating disease, we are apt to go to extremes; we are apt to be too enthusiastic with remedies. So with electricity, those who have followed it have been too sanguine and too enthusiastic as to its effects in *all* uterine tumors. I believe if you select your cases, and use electricity intelligently, that where many women are miserable, and there is nothing left to them but hysterectomy, which is more or less a serious operation, you will make them well women in the sense referred to, comfortable, able to attend to their duties and to go about as other women.

Dr. Mynter, of Buffalo.—Dr. Ford has called attention to

one fact which I think in a measure explains why some physicians get electrolytic action, and speak about electrolysis, while others get electro-chemical action, and speak about electro-chemistry. He calls attention to the different batteries, one consisting of a great many small cells giving an intense current—that is the one which most of us use. The instruments we ordinarily buy from the dealer produce an electro-chemical action and not electrolytic action, according to Dr. Ford's statement. The other battery, having large cells, gives a great deal of volume and electrolytic action, and that is exactly the kind we do not see, excepting those who make them for themselves. I think in that point, if Dr. Ford is correct, which I do not doubt, may be found the difference in the general belief in regard to electrolysis and electro-chemical action. I have always used a battery with a great many small elements. I have never seen anything I could call electrolytic action, but most frequently electro-chemical action, with the formation of large ulcers. Some ten years ago, when I was younger than I am now and less cautious, I chloroformed a patient and stuck a large needle into an extra-mural fibroid and passed a current from forty-two elements through it, producing an enormous slough. The woman did not die, but with the needle in I could put my finger into the centre of the tumor through the vaginal wall. I think we owe Dr. Ford thanks for his explanation.

Dr. George Keith, of Edinburgh.—An important point in treating fibroids by electricity is the matter of diagnosis. It makes a great difference whether you make a good diagnosis or not. A physician making a poor diagnosis and treating by electricity will be discouraged; and it is not always an easy matter to distinguish fibroids from ovarian cysts, etc. I know of a very distinguished surgeon who treated an ovarian tumor for eight months with electricity, and then he said he did not consider that electricity was any use for fibroid tumor; so I think one of the first things is to make a diagnosis and then treat. I do not quite agree with Dr. Skene when he says that the intra-uterine pole has not a cauterizing action. I think it has to a great extent, and that the stenosis which he speaks about is more from the decrease in the size of the tumor and the decrease of the cavity of the uterus in that way.

Dr. Rosebrugh, of Hamilton, Ontario.—I merely wish to ask Dr. Skene and Dr. Wilson a question: Did they not at the same time use medical means, such as giving ergot, at the time they were using the electricity?

Dr. Wilson.—For years I have tried ergot to the bitter end; it has no more effect than cold water. I long since ceased to use it, never give any medicine except to regulate the bowels, and use the bromide of potash for the nervous system. Years ago I did give ergot hypodermically, by the mouth, and in other forms, but I never saw it have the slightest effect in fibroid tumors.

Dr. Ford.—I would like to say a word on this question of recovery. I have seen cases recover. I was on record two years ago as saying that I never saw a fibroid tumor entirely disappear. I have since that time seen three or four cases in which the fibroids totally disappeared, but not, however, until three or four months had elapsed after the treatment was discontinued. I have a very good record of half a dozen of these cases. I reported one case of fibro-cyst in a woman under forty, who had not yet reached the menopause, which was diagnosed by one of the members of this Society and by myself, in which I had applied galvanism for some three months with very marked improvement, but still the tumor had not entirely disappeared. Six months after I read the paper I got a letter from the lady's husband, saying that the tumor had disappeared. He said that the examination of the physician in the town where she lived failed to reveal it. I asked her to come to town, and six months after the pelvis was entirely free from the tumor. There are a few cases of recovery in that sense. I think if you carefully examine the work of Apostoli you will find that he does not claim that all tumors disappear; I am surprised, though, at the number of small fibroids he treats. It seems to me to be useless to treat these small fibroids, and when they do not give any symptoms they should be left alone. I have never found soft œdematous tumors the growth of which could not be arrested by galvanism, but I have found that very hard fibroids will not be dispersed unless you proceed to cauterize. I have such a case now in which I opened the abdomen under a mistaken diagnosis of ovarian

cyst which filled the abdomen. I proceeded to operate and found a fibroid which was the most evenly developed of any tumor I ever saw, and very hard. The abdominal walls were very thick, which was perhaps an excuse for the error in diagnosis. After twenty days I began my treatment by galvanism, and I could make no impression on it until I carried it to a point of cauterization.

Dr. Eugene C. Gehrung, of St. Louis.—Does Dr. Ford use the puncture electrode, or simply through the intra-uterine?

Dr. Ford.—Both. I never use the puncture where I can get inside the uterus. I use either the platinum or carbon electrode.

Dr. Gehrung.—It seems to me difficult to understand that fibroid tumors may be made to disappear by applying one electrode within the uterus and the other on the abdominal walls or elsewhere, and by passing a current of electricity indirectly through the tumor throw the full burden on the uterus, an organ which is by no means devoid of sensibility nor vulnerability, without perhaps as much harm to the latter as benefit to the former. It is not surprising that such enormous doses are used, and yet in most cases but a doubtful symptomatic or palliative result is obtained.

The chances for dispersion of these tumors, it seems to me, are much greater when the electrode is inserted directly into the tumors by means of a puncture. The puncture itself disturbs, to a certain extent, the vitality of these growths, in which process it is assisted and excelled by the destructive action on cell-growth of electrolysis, which takes place most lively in the immediate neighborhood of the (cathode) electrode. A much weaker current may thus be used and a much greater result may be obtained. The puncture *per vaginam* can be rendered much less dangerous, if instead of the usual solid (needle) electrode, the hollow (canula) electrode proposed and devised by me a few years ago (*American Journal of Obstetrics*, September, 1888) is used, so that the fluids and gases produced by the electrolytic process may freely escape through the canula, instead of being pent up in the tumor on the withdrawal of the needle or solid electrode. To avoid the necessity of repeating the puncture, the canula, if of non-corrosive material, may be left *in situ*, to be

used again and again as an electrode as may be desired, and as a drainage tube from one application to the other; since the electrolytic action does not apparently cease with the withdrawal of the electricity, but, on the contrary, as my experience has taught me, continues for a considerable length of time, though to less extent, even for days, and thus the tumor becomes sapped, its vitality destroyed or diminished, and it shrinks up gradually.

There are other tumors found in the pelvis which respond much better to the electrolytic puncture than do fibroids. These are the intra-ligamentous or exudation tumors, the product of inflammatory processes in the pelvic tissues. They frequently fill the true pelvis and rise considerably above it and form adhesions wherever they touch. They are of all degrees of solidity, even to chondroid hardness. To attempt the removal of these by the knife would be worse than useless, if not fatal. These tumors are by no means harmless, as they may destroy the patient by occluding the bladder, the rectum, etc. In these tumors electrolysis appears to be the remedy *par excellence*.

I have treated a number of such cases by electrolysis with puncture, and have obtained excellent results. To illustrate, I shall mention one case, which is still under treatment. In this there were two very hard tumors filling, by the addition of intermediate masses of infiltration, every available space in the small pelvis, binding down the hypertrophied and retroflexed uterus, and reaching about two inches above the symphysis pubis. This mass was completely immovable, and caused the patient great distress. One electrolytic puncture with a repeated application of a current strength of from forty to seventy-five milliampères, and the consequent gradual drainage of a few ounces from each of slightly sero-sanguinolent fluid, caused such a decrease in size and loosening of the adhesions, that I was enabled to push the mass out of the small pelvis, and to support it there by means of a pessary, to the great relief of the patient.

This is the instrument by means of which I treat these tumors. (Instrument submitted.) It consists, as you see, of a trocar and double canula, to either of which—the trocar or the canula—the electrode may be attached. The canula is short, so that the part not buried in the tumor may be ensconced in the vagina. This

trocar and canula is plunged into the tumor, and through it the current is applied. Then the trocar is removed and the canula is left in position to act as a drainage-tube for several days, while the electrolysis may be practised daily through it without the necessity of repeating the puncture.

If by accident or design a cavity in the tumor is tapped, we may profit by the fluid contained in it to conduct the electricity to the cyst-wall, after which the contents may be permitted to escape through the canula by removing the trocar. If it is found desirable to wash out the cavity of the cyst, and to apply therapeutic agents to its lining, the inner canula must be substituted for the trocar just removed. The outer canula must be connected, by means of rubber tubing, with a vessel containing the fluid to be used, while the inner canula must be connected by the same means to an aspirator. The latter being set in motion, any fluid, such as water, solution of bichloride of mercury, tincture of iodine, etc., may be made to pass through the cavity of the cyst, without danger of forcing any of it into the surrounding tissues or organs, as the fluids are drawn into the cyst as by a siphon instead of being forced into it as by injection.

The electrolysis causes adhesions between the different tissues through which the canula passes, and thus connects the interior of the tumor or cyst with the vagina by a straight fistulous tract. Infiltration of fluids into the intermediate spaces becomes through this extra safeguard, as well as through the presence of the drainage-tube, an impossibility; thereby rendering the puncture by electrolysis a much more safe procedure than even the puncture by an ordinary aspirator needle.

Dr. Skene.—The question asked by Dr. Rosebrugh is one of experience largely. Dr. Wilson, I think, answered it fully according to his observations. I may add a little of my experience to that of Dr. Wilson.

In regard to the use of other means conjoined with the use of electricity I would say this: In my cases I have employed other means; I seldom use ergot now, but I did use it long before we got any idea of electrolysis, but I have abandoned it long ago. In the case of a submucous tumor with a tendency to become pediculated, or in one that is undergoing the natural mode of

elimination by the contraction of the uterus, ergot will help to carry on the process, but those are the cases which do not call for electrolysis.

We often have patients who suffer so much from menorrhagia, that it is difficult to treat them even with the carbon electrode. In these cases I generally curette the cavity of the uterus and in that way control the hemorrhage for a time. The bleeding in fibroids is due first to the presence of the fibroid, but largely to the endometritis developed by the presence of the neoplasm. In these cases we can make much better progress by removing the hypertrophied portion of the mucous membrane, and in that way controlling the hemorrhage to some extent, and then the electrolysis will continue the treatment. In these I invariably apply iodine thoroughly to the mucous membrane at each *séance* before using electrolysis, for two reasons—because it is the best means I know of for controlling the tendency to proliferation of the mucous membrane, and because it is a disinfectant. I believe much can be done in the way of making the treatment safe by thoroughly disinfecting the cavity before introducing an electrode. In cases in which the hemorrhage is not so marked I would use the ordinary disinfectant, such as bichloride, which I employ in other departments of surgery, but in obstinate cases of hemorrhage I have used iodine and hydrastis Canadensis internally with good results. I believe that the latter has a good influence on the mucous membranes of the uterus, and it is harmless in its effects. I have often used it in connection with curetting, iodine, and electricity.

Dr. Ford.—I would like to ask the gentlemen not to forget the principal point—that the current carried by your electrode must be sufficient to produce electrolysis. If you want electrolysis to cure, you must have a sufficient quantity of electricity to produce electrolysis

VAGINAL FIXATION OF THE STUMP IN ABDOMINAL HYSTERECTOMY.

By Henry T. Byford, M.D.,
Chicago.

At the last meeting of this Society I presented a paper advocating vaginal fixation of the stump in abdominal hysterectomy,[1] and related an illustrative case. Having now had an experience of eight cases in point, and having found it expedient to modify in some details the procedures then described, I have deemed it best to supplement last year's paper by a short report.

The method then presented consisted in making a stump of the Schröder-Martin intra-peritoneal variety, and then (instead of dropping it in the abdominal cavity) separating the bladder from the cervix, cutting and tearing down through the anterior vaginal wall, anteverting (not inverting) the stump into the vagina, and holding it there by tenaculum-forceps. The peritoneal cavity was closed over the stump by suturing the reflected edge of the bladder peritoneum to the posterior surface of the stump with catgut.

In my first case I did not carry out my plan completely, but, after putting an elastic ligature around the cervix, cut off the tumor, opened into the anterior vaginal fornix, and, with the rubber ligature attached, turned the stump forward through the opening made into the vagina.

In my next case (December 14, 1889, at the Woman's

[1] A New Method of Treating the Stump in Vaginal Hysterectomy, 1889.

Hospital) I carried out the method as I had planned it, and had a smooth recovery, without sloughing or untoward symptoms of any kind, except that my sutures, which were silk, ulcerated out.

In my third case (Mrs. C., Woman's Hospital, February 15, 1890) I ligated the uterine artery on either side with silk, sewed up the stump edges with catgut, turned the stump anteriorly into the vagina, and held it there by clamp-forceps, but used no compression. I drained the abdominal cavity through the abdominal incision. The sutured edges of the stump sloughed, but the broad, shovel-shaped blades of the forceps enclosed it almost completely, and thus protected the living parts from septic danger. The slough came off on the ninth day. She made a good recovery.

In my fourth case (Mrs. Mary M., Woman's Hospital, April 9, 1890) I sewed up the stump as in the third case, and clamped it in the vagina. Abdominal cavity not drained; recovery prompt and uneventful, except that the stump sloughed; so little was the disturbance produced by it that I did not know that sloughing had occurred until April 20th, eleven days after the operation. The clamp-forceps enclosed it almost completely. The slough came off in twelve days.

The operation in the fifth case (Mrs. B., Woman's Hospital, April 17, 1890) was done the same as in the last two, except that I used ordinary tenaculum-forceps on the stump. The sloughing caused a temperature of $100\frac{4}{5}^{\circ}$ F., but no other trouble. Stump came off in ten days.

In the sixth case (Mrs. P. A. P., Woman's Hospital, April 18, 1890) the stump was treated the same as in the fifth case, but it was nearly two inches long, including some of the uterine body. The bladder was drawn high up, intimately adherent, and was wounded while being separated. I sewed up the rent in it with a catgut puckering string, and brought the ends down into the vagina. The peritoneal cavity was shut off above the bladder-wound by suturing the peritoneal edges of the stump, as in all the other cases. The edges of

the stump sloughed off in eleven days. The bladder-wound healed by first intention.

In none of these cases were there any symptoms of peritonitis, either abdominal or pelvic. In all but one the abdominal surface remained flat or concave.

The seventh case (Mrs. H. F., Woman's Hospital, April 25, 1890) was different from these in that the patient died of general septic peritonitis at the beginning of the fourth day, and was subjected to a post-mortem examination. The abdominal walls were four inches thick, and the tumors so thoroughly imbedded in both broad ligaments that their removal had been almost impossible, and had involved a long exposure and considerable handling of the intestines. The peritonitis was much less in severity in the pelvis than higher up, about the abdominal incision, where it had advanced to suppuration. The end of the stump was beginning to undergo necrosis, was quite a distance below the well-united edges of the peritoneal membrane, and had caused no change in it. The death was entirely unconnected with the treatment of the stump, and afforded an opportunity for verifying the fact that the peritoneum is completely and safely shut off by this method. The stumps of the broad ligaments lay on either side of the pelvis, and the whole field of the operation looked like a single line of fine sutures across the bottom of the cavity. The fatal case proved the usefulness of the method more convincingly than the successful ones.

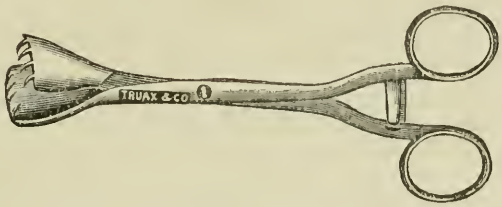
It is noticeable that in each of these cases the upper end of the stump sloughed, except in the second, in which the stitches ulcerated out. This was partly due to the interference with circulation by the sutures in the thin edges, and partly to the constrained position of the cervix after ligating the uterine arteries. Compression did not cause it, because in some cases tenaculum-forceps were used. The sloughing, however, caused so little disturbance when the protecting clamp-forceps were used, that I concluded to simplify matters at subsequent operations by putting on the clamp as tightly as

possible, and hastening the formation and separation of the slough, the same as in ventral fixation. We might prevent the necrosis of the thin edges by cutting the stump square off, and, after ligating with silk, searing with actual cautery, to prevent hemorrhage and granulation ; but this would not prevent the silk ligatures from ulcerating and causing a fistulous track in case they were embedded too deeply to be readily removed.

In the eighth case (Mrs. Mary S., Woman's Hospital, September 1, 1890) I thus simplified the operation, and gave up the attempt to prevent sloughing or ulceration of the stump. After separating extensive pelvic and intestinal adhesions over the site of an old suppurating hæmatocele, tying the broad ligaments, separating the bladder, and placing the elastic ligature, I cut off the tumor, and ligated the stump just above the rubber tubing in four parts with strong silk. I then hollowed it out in the centre, and drew the anterior and posterior peritoneal edges together with two long silk threads. Thus the stump was flattened antero-posteriorly, and prepared for the clamp, and at the same time furnished with silk threads to be used in pulling it down into the vagina. It now took but a moment to force a pair of hæmostatic forceps through the anterior vaginal wall, enlarge the opening thus made laterally and anteriorly, turn down the cervix, and clamp it tightly. The rest of the operation was as in the preceding cases. In this case I wasted no time in accurately sewing up the edges of the stump, but clamped it within the vagina, so as to produce necrosis as quickly as possible. The temperature went as high as $100\frac{3}{5}°$ only twice: once on the third, and once on the fourth day. After the sixth day it never reached 100° F., and was recorded as normal every morning except the third and fourth mornings. The pulse was seldom up to 80, and often below 70. The slough separated on the fourteenth day. Abdominal wound healed by first intention. The tumor was the size of an adult head. One per cent. vaginal douches were used every six hours after the third day.

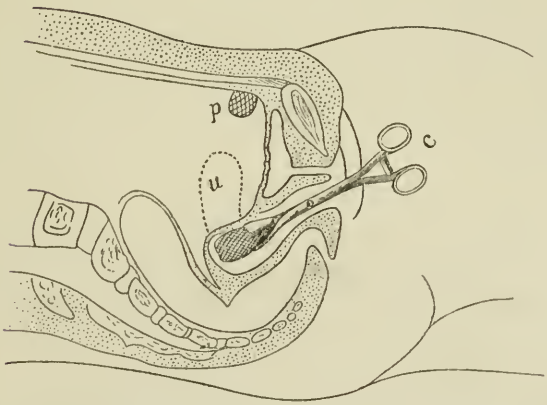
The characteristic steps, then, of the operation as I now perform it are these: Ligate the broad ligaments; separate the bladder from the cervix; put on a temporary elastic ligature below the tumor; transfix and cut off the mass above; ligate the stump in several parts with silk; remove the elastic

Fig. 1.



Clamp forceps.

Fig. 2.



c. Clamp forceps applied; *p.* Position of stump in ventral fixation; *n.* Normal position of uterus.

ligature; perforate the anterior vaginal wall in front of the cervix; turn the stump forward into the vagina, and clamp it firmly there; sew the peritoneal edge that was separated along with the bladder from the anterior surface of the uterus, to the posterior surface of the stump, so as to close off the peritoneal cavity from the vagina; close the ventral incision,

with or without toilet and drainage, as in other cases. A small strip of iodoform gauze, stuffed from below into the rent in the anterior vaginal wall, and left for twenty-four or thirty-six hours, may be used to prevent any possible accumulation of discharge at that point. The time occupied in separating the bladder and anterior vaginal wall from the cervix and putting on the clamp-forceps should be no longer than for the preparation and adjustment of the stump in ventral fixation. The other steps are practically the same. Bladder wounds can be treated extra-peritoneally without displacement of the viscus (see the sixth case).

As to the final position of the cervix: In each case the shortened upper end worked its way back into the connective tissue behind the bladder, so that in a few weeks the os and the cervical canal were normal as to position and mobility.

A superficial examination would, in most cases, lead a stranger to believe that a normal fundus uteri was there in a normal position. Bladder symptoms were not present in any case. A more desirable consummation could scarcely be looked for.[1]

DISCUSSION.

Dr. Howard A. Kelly, of Baltimore.—Mr. President, in listening for the first time to a paper containing a novel proposition for the conduct of an important surgical procedure, it is impossible to criticise and do full justice to its merits. I shall, therefore, first use my privilege in opening the discussion, to speak critically of various modes of treatment of the stump in fibroid tumors.

It is important to-day to keep constantly in mind the fact that fibroid tumors are practically of four classes:

1. Smaller submucous tumors within the uterus and sometimes pediculated. These can easily be removed through the cervix.

2. Sessile or pediculated subserous tumors, or large submucous

[1] Since writing this paper, I have operated upon two other cases in this manner, both times successfully.—H. T. B.

growths, which can be removed through the abdominal incision by enucleation (myomectomy) without the sacrifice of any substantial part of the uterus.

3. Large tumors occupying the body of the uterus, in which it is possible to form a pedicle by tying and cutting down through the broad ligaments to the uterine body below the mass, which can then be constricted and removed by supra-vaginal hysterectomy (hystero-myomectomy).

4. Finally, there is a class which includes the cases which every one, by a tacit consent, seems to shun discussing; this is a well-defined class of exceedingly difficult cases, in which the patient usually dies during or soon after an operation; here the fibroids, extending from fundus to cervix, spread out laterally in the broad ligaments down toward the vagina and up under the peritoneum, presenting no suggestion of a pedicle. The loss of blood during the operation is excessive, and the patient usually dies of shock within two or three days. These, we might say, are a class of atypical cases, as each one differs from the rest, and no well-defined procedure has been proposed by which we can safely attack them.

To-day we are discussing Class 3, that is, those cases in which we can get a pedicle with more or less facility; and we must constantly remember that these are the most successful cases under any of a number of plans of treatment already in practice.

Such cases ought always to exhibit a slight mortality, in some measure approximating the mortality of ovariotomy.

Dr. Byford's suggestions relate to this class; let us, therefore, consider what are the important factors to be borne in mind in building up a plan of treatment for these cases.

The factors are these. In the first place, the operation differs from ovariotomy because we have to deal with a large muscular pedicle, which is liable to contract, so that ligatures which completely controlled the hemorrhage at the operation may relax within a few hours by the contraction of the tissues in the stump, giving rise to a dangerous hemorrhage. The next important factor is, that the stump invariably contains part of the lumen of the uterine canal. Here is a dangerous source of contamination often producing sepsis.

Two opposite plans of treatment, destined to overcome these difficulties, have found general favor in these cases; first, by sewing up the raw surface of the stump and dropping the pedicle into the abdominal cavity with or without drainage, and the second, by treating the pedicle outside of the abdominal cavity. A third plan (my own) combines the extra- and intra-peritoneal treatment.

The method of dropping the pedicle back into the abdominal cavity had such a frightful mortality at the outset that men everywhere abandoned it, leaving Schröder alone to continue his efforts in the hope of perfecting the technique and improving the results. Now, at length, the persistent efforts in this direction, owing to a most thorough disinfection of the stump, and a new plan of suturing together the opposite faces of the stump in the hands of Zweifel,[1] of Leipzig, have proved so successful that this has again become a legitimate and an admirable procedure.

Hegar's is the external method, which, as you all know, consists in constricting the base of the tumor with an elastic ligature, and suspending it with the parietal peritoneum united to the stump just below the ligature in the lower angle of the abdominal wound and waiting until the distal end of the stump sloughs off. This method has yielded excellent results, and was, in fact, for a long time the best, but it is surely repugnant to any surgeon, in the presence of another procedure offering as good chances, minus the constricting sloughing process—about as unsurgical as it would be to amputate a finger by tying a string tightly around it and waiting for the sloughing process to remove it. In addition to this the method often presents a serious mechanical difficulty: when the stump is short it can hardly be dragged high enough to be attached.

My own plan has been to close up the raw face of the stump carefully, as in Schröder's method, bringing the flaps together by a series of buried sutures, and when the edges are reached to use a series of interrupted superficial sutures, left long enough to suspend the stump afterward in the lower angle of the abdominal wound.

The stump thus sewed up is like an old-fashioned, closed purse,

[1] Treatment of the Stump after Supra-vaginal Hysterectomy.

and is attached at the lower angle of the incision by uniting the parietal peritoneum of the abdominal wall to the stump just below the closed mouth of the purse, usually just above the position of the rubber ligature which has previously been removed. In this way a short stump can be suspended with ease. The abdominal wound is closed down to the stump, and the pocket between the stump and the skin is packed with gauze. Through a little slit in the middle of a large square of gauze laid upon the abdomen, the long sutures on the face of the stump are drawn and grasped in a pair of ordinary long clamp forceps. Over this the ordinary dressing and binder are applied. Often the wound needs no attention for six or eight days. This method has stood the test of about nine cases with one death, which was due to chronic visceral lesions. I have two cases at the hospital now, in which the recovery has been as simple as though I had performed an easy ovariotomy.

Dr. Byford has just now offered us another alternative, also limited to this third class of cases. His proposal would seem in some cases to be a simple and effective means of disposing of the stump, but it must be conducted with great care as to the details, particularly in the exclusion of the general peritoneum from the wound area and the opening in the vagina by careful suture. It must be difficult to apply when dealing with a very broad pedicle or a long pedicle, such as we make when the tumor is limited to the fundus uteri. A further point of disadvantage must be the additional technique called for in splitting the vagina in the anterior fornix.

I congratulate Dr. Byford on his originality, and the result in the cases just reported, in which he has tested his method, and feel that we shall all look with interest for further news from him in this direction.

Dr. A. W. Johnstone, of Cincinnati.—Dr. Polk has had as much to do with the management of that last class of tumors which give us very thick pedicles as anybody, and I believe that I voice the sentiment of this body when I ask for his ideas upon the subject.

Dr. William M. Polk, of New York.—The subject is one of such breadth that I shall gladly avail myself of Dr. Johnstone's

suggestion to confine my remarks to the method to be adopted in the treatment of the last class of cases enumerated by Dr. Kelly. As Dr. Kelly has justly said, they really constitute the difficult cases now before us—so difficult, in fact, that I suspect, if statistics were to be based on the mortality attending the removal of that class, it would mount so high as to give the enemies of hysterectomy an admirable chance to boast themselves of the wonderful results to be obtained by electricity in preference to hysterectomy. Therefore, it appears to me that those of us who are interested in this subject sufficiently to stand for the surgical treatment of a certain class of cases of fibroma, are compelled to do our utmost to remove the stigma which as yet rests upon this class.

That, then, being the case, in common with many others I have given some attention to the development of a plan by which we could relieve the patients and yet keep down the mortality rate. I am free to say, sir, that the plan adopted has been but little more than a modification, or better speaking still, an adaptation of one suggested by Dr. Miner, of Buffalo, in the treatment of non-pediculated ovarian tumors, namely, by a process of enucleation. That, in substance, is the method adopted in the treatment of these cases. Those of us who have dealt with them recognize fully the breadth of attachment which we may have, but we can always rely upon the anatomy of the organ. We can always rely upon its receiving its blood through four well-established routes, two upon each side. Although there may be blood-supplies from adhesions, as a rule the hemorrhage to be expected from such adhesions is so slight that practically we may exclude them. We have, then, four sources of hemorrhage, two ovarian and two uterine on either side, which we can secure, and enucleation in the class of cases suggested can be accomplished. I admit, sir, that the difficulties of stripping off the outer covering of the uterus with a broad base, a base containing a fibroma for instance, is by no means an easy matter. It partakes much more of a dissection than a simple stripping-off process, and in that lies really the objection to the procedure. Fortunately, however, this objection can only apply to the posterior region of the growth, as anteriorly—that is, between the

layers of the broad ligaments and in front of them the peritoneum is as loosely attached as in the case of ovarian tumor, of which I have spoken. Your dissection, therefore, is confined to the posterior aspect of the growth.

I will avail myself of Dr. Kelly's sketch on the board here, as I have frequently had proof of his superiority in that direction as an aid to demonstration, simply saying that along here is the broad ligament, and out here within it are some irregular growths, which, with the aid of your imagination, you will be able to appreciate as fibroid projections. Having, then, growths of the character in question that spring from the lower segment of the uterus, you make your abdominal incision, and deliver your tumor exactly as we now do in the well-recognized procedure. Then you tie from above downward, tying as you go, remembering the well-recognized anatomical relations, securing the ovarian vessels on either side, giving yourself ample room for shrinkage of tissue, and tying as closely to the uterus as you can, taking care to get rid of your ovaries as you go. Then tie the pampiniform plexus. Using forceps to control bleeding from the uterine end of vessels, work your way down until you have reached a point about three inches, we will say, from the junction of the cervix with the vagina, the utero-vaginal junction. Then feel along the side of the uterus for the uterine artery. That is really the difficult step in the operation, to find the uterine artery at the base of such a growth. Having freed the tumor from its broad-ligament attachments above, having it well elevated, and aiding your hand if necessary by one placed in the vagina, you can ligate the uterine vessel. It is not necessary to isolate that vessel, as has been urged by my colleague, Professor Simpson, in his article on the ligation of this vessel, for the reason that it may be tied *en masse* without danger of slipping, as you have here a large portion of tissue outside of your ligation. Secure the uterine artery, therefore, well away from the cervix—and I say well away from the cervix for the reason that the distributions of that vessel, particularly its anterior distributions, are by no means constant. It will be found, for instance, that the vessel which corresponds to the superior vesical artery in the male is oftentimes given off well away from the

uterus, and if you simply secure the trunk of the main vessel beyond the departure of this superior vesical, you will have some trouble. After finding the vessel, and securing it far enough away from the cervical junction, you will not find any great difficulty in controlling the bleeding from the base. Having done this, the really difficult portion of the procedure is accomplished. Then make a circular incision about the mass, three or four inches from the cervico-vaginal junction, carrying your incision anteriorly through the peritoneum only, but laterally and posteriorly through the external muscular coat. Then enucleate below the incision.

When you come to the lateral aspects of the uterus I would suggest that you there encroach well upon the uterine tissue, that you go far enough into the uterus to get well hold of the trunk of this uterine vessel, which you know runs along the lateral aspect, between the folds of the broad ligament. Encroach, therefore, well upon the uterine structure just anterior to the line of the uterine artery, and then, encroaching well upon the uterus as you go, so as to strip down the external coat, carry your dissection around behind. You have then created a collar of dissected-away tissue, and this you increase and deepen until you get to the base of the tumor, then cut away the mass at the lowest point of enucleation. In certain cases you will find a good deal of hemorrhage from the posterior wall, dependent evidently upon the vessels in the utero-sacral ligaments. I purposely omitted the mention of this as a source of supply for these tumors, for I wished to call attention here to the possibility of that source of supply being sufficiently great in some of these cases to make it necessary for you to ligate the utero-sacral ligament on either side. That is easily done: simply avoiding the intestines you can ligate *en masse*.

After cutting away the mass, secure any bleeding-point which may appear; then, taking a Paquelin cautery burn a hole through the cervical canal so that you can run your finger through it. Understand that you have not as bulky a sac as one would at first suppose, for the reason that the anterior portion is thin peritoneum. The bulky portion is along the posterior wall of the sac, which contains a considerable amount of uterine tissue, pretty much the whole of the external coat of the uterus

posteriorly. Still folding it in, you stitch the sac to the outer wound, and pack the cavity with iodoformed gauze, which is brought out at the opening, and then you close your abdominal incision about it in the way which we adopt in the treatment of ovarian tumors that are enucleated in a like manner. That is the principle, sir, which I have adopted, and found successful in the treatment of cases of this character.

In some cases you will have oozing from the stump that will come from anastomosis from the bladder and vagina, but the oozing is of such a nature that the free application of the cautery to the base of tumor at the time that you burn the hole through the cervix will readily control it, and if that does not you can always pack sufficiently to get rid of it. I speak of this as a contingency which may occur, which, however, I am glad to say, I have thus far escaped.

Of course, as I said at the beginning of my remarks, this method is one that, to my mind if adopted, should be restricted entirely to the class of cases of which I have spoken. Those cases in which you have the pedicle readily obtainable, can be better treated by the method suggested by Dr. Kelly or by that suggested by Dr. Byford. I am quite sure, sir, that this latter method, or some modification of it, is one which gives us the ideal procedure in all cases of the kind, for the reason that the danger in vaginal hysterectomy is from the cervix.

Dr. E. C. Dudley, of Chicago.—Mr. President, the question is on the advisability of this procedure of Dr. Byford's in hysterectomy. The operation certainly fulfils most perfectly the conditions which a safe operation requires, that is, an extra-peritoneal treatment of the pedicle. There are grave objections to fixing the uterine stump in the abdominal wound. In Dr. Byford's operation we have an extra-peritoneal method which leaves the uterus in very nearly its normal position, and does not disturb the circulation of the parts, and for that reason it commends itself very strongly. My own experience of this method is confined to two cases with uneventful recoveries.

The operation is almost ideal. It leaves the peritoneum perfectly clear, and if done with care leaves it almost free from ligatures, because most of them may be drawn through into the vagina.

In the two cases mentioned I have added the Mikulicz drainage, for fear the stump might pull back into the peritoneal cavity. This drainage is applied as follows: A piece of iodoform, or other surgically clean gauze, not so impregnated with antiseptic drugs as to irritate, about a foot square, with a string attached to the centre, is thrust down through the lower part of the abdominal wound into the region of the operation so as to form an open pocket, the string projecting out through the opening. This pocket is then packed full with a long strip of gauze; all to be covered with an absorbent dressing which should be renewed often enough to make it effectively absorb any fluids which may come out. The strip should be left for one week and then gradually removed on the eighth, ninth, and tenth days. The pocket should then be removed as rapidly as it will come out easily. The Mikulicz drain seems a little audacious, but its drainage is safe and effective. The gauze pocket may be left in a long time with impunity. In two cases the last of the pocket was not removed until the end of the fifth and sixth weeks. Very soon after the gauze is put in position the peritoneal surfaces around it become agglutinated and it forms a cavity of its own, and if any septic material for any reason finds its way into this cavity, it is carried off by means of the capillary drainage.

This method insures absolute and timely isolation of the field of operation from the general peritoneum, and thereby must go far toward reducing the mortality of bad drainage-cases.

I can add very little more, sir, to what Dr. Byford has already said. He has given us an excellent method of hysterectomy for fibroids.

The President.—The subject is one of such exceeding interest, especially with the treatment it has thus far received, that I hope any gentleman who has an inquiry to make or any further remarks to offer, will be kind enough to let us hear from him.

Dr. A. J. C. Skene.—Mr. President, I will confine myself to the subject under discussion, which is the management of the stump after hysterectomy.

This is certainly a very important suggestion, or idea, introduced by Dr. Byford, but it seems to me that it is restricted in its application to a certain class of cases, and that I fancy a limited

one—and one that is becoming far more limited, as has been pointed out by Dr, Kelly. I can hardly see its practical application in the majority of cases where the stump is large, as it nearly always is in cases in which hysterectomy is justifiable. If it is then limited, as I think it must be, to those cases in which the cervix or the stump is small, the question, to my mind, arises whether, when the doctor has gone so far as to open the vagina and bring the stump into the vagina, he might not go a little farther and separate the uterus from the peritoneum posteriorly, and (as he has already ligated the uterine arteries on either side) remove the cervix entirely. This has been done by others. It seems to me that when you come so near disposing of the uterus entirely you might just as well complete it. That is a thought, sir, which I bring before you for what it is worth.

Again, the question arises, Is his method an improvement upon that method of cutting off the blood-supply by a ligature on either side and then dilating and producing inversion of the cervix? That has been done, and I thought I could quote the authority, but the name has passed out of my mind, and also the name and date of the journal in which I found it. I applied to one of our former Brooklyn "medical libraries" just now, and he also has forgotten, but he assures me that I am right, although he cannot supply the authority. The question is, Why might not that answer equally as well? Then you do not wound the vagina at all; you simply have this stump with the blood-supply cut off, you forcibly dilate it, turn it inside out and then clamp it if need be.

Before we can decide on the merits of this operation for the treatment of the pedicle we must take those things into consideration. I merely mention them, and shall hold the reader's operation or method under judgment until I have time to see how it compares in its practical application to the method of complete removal and that of dilatation and inversion. I shall not have so many opportunities, perhaps, as Dr. Byford or some others have had to try it, but as I happen to be one who is neither enthusiastically in favor of hysterectomy nor at all opposed to it, when it is advantageously employed and necessary, I hope to be able to judge of the relative value of Dr. Byford's method.

Dr. Joseph Taber Johnson, of Washington.—Mr. President and Gentlemen, I have only a few words to say, inasmuch as my experience is slight in these cases, being covered by nine supra-vaginal hysterectomies. The first four of my patients died, and I almost gave up doing this operation for fear I never would succeed, but on studying up the subject more thoroughly under the instruction of Bantock, I became very much impressed with his operation as he described it before our Society, and as he performs it. Subsequent operations I performed as he teaches, and in the five operations after the first four, embracing tumors some of which weighed as much as twenty pounds, all the patients recovered.

This method of doing the operation has been exceedingly successful in the hands of Bantock, and a short time ago in visiting a prominent operator in Philadelphia, he told me he had had twenty-seven supra-vaginal hysterectomies in a year, according to my recollection, which he performed by the Bantock method, and they all recovered. If the operation is to be modified after such remarkable success has been obtained (notably the success of Keith, before he abandoned the operation, and went into electricity for the treatment of fibroids), it seems to me that the modifications to be accepted should have had as great, or greater, success than has been reported by Bantock, and by those who have performed the operation with the serre nœud, completely shutting off the peritoneal cavity by suturing the peritoneum to the stump underneath the clamp, and completely closing the abdominal opening, leaving the clamped stump outside. Dr. Kelly objects to this procedure as unsurgical, because it leaves a nasty, sloughing stump for a long time. Many do recover, however, and in my opinion it is much better to have them recover, even though it may be after as long a convalescence as eight weeks, than to try some other operation, and not have them get well at all.

It seems to me, having no experience whatever with Dr. Byford's modification, that the suggestion made by Dr. Skene would be the one that would give us the most ideal method of treating these cases, that is, removing the infecting stump and cervix altogether, and closing the abdominal wound completely,

and the vaginal roof, with only enough opening for proper drainage.

Dr. Dudley.—I have attempted once or twice to invert the stump after dilating the remaining portion of the cervix, but it would not invert even after a great deal of dilatation. I have also once or twice attempted to remove the entire stump, and to secure hæmostasis by forcipressure through the vagina. This can be done, but those who try it will find that while it is easy to describe it is hard to do.

I think the method of Dr. Byford will be found applicable even to the last class of cases described by Dr. Kelly, and spoken of by Dr. Polk, especially if the size of the cervix be reduced by the cautery, as described by Dr. Polk. The vagina is quite capacious, and will hold a pretty large stump.

Dr. Keith.—I would like to correct the statement by Dr. Johnson that my father has given up hysterectomy. That is a mistake; he has given it up in this way, that he gives a patient the benefit of electricity first, and if that is of no use, he proceeds to operate. Last week he wrote me that he had a short time before removed a large fibroid by hysterectomy.

Dr. Polk.—On the part of this Society I would rise to thank Dr. Keith for making that statement, for I confess his father's views in regard to electricity, as I understood them, were staggering to me. I began to view hysterectomy with doubt, but his statement makes the matter entirely clear, and enables all of us to stand alongside of him in a position we hope to maintain for some time to come.

Since the subject has broadened somewhat, I would simply say that I have tried all the methods of operation that have been suggested here. I have taken out the whole uterus, cervix and all, three times, and I have used the clamps in the manner alluded to by Dr. Dudley. Although strong expressions in these discussions weaken the statements, I cannot forbear applying the term "beastly" to the operation of applying clamps through the vagina to the right and left side of the uterus as a means of operating in hysterectomy for fibroma. It is a difficult procedure, and one that gives you a very unsatisfactory result, and one which is by no means equal to that which is to be obtained

by the use of the ligature. The great difficulty, however, with the use of the ligature in complete extirpation I have found is that you get some cases in which the cervix is so large and deep down that it is hard to enucleate it entirely without a good deal of bleeding (coming from the vagina), which prolongs the procedure. By putting the patient in the position of Trendelenburg, you can undoubtedly get ready access to the bottom of the excavation, but even then you will find that a good deal of time is lost.

Now, the procedure suggested by Dr. Byford (and I did not mention this before for the reason that my remarks were intended to be confined to one class of cases) has, if I am not mistaken, been suggested in a modified form by a German operator either since Byford's first operation or before, I cannot say which. This method is certainly one which, to my mind, simplifies the operation a good deal, and shortens it, which are two important considerations in these capital operations.

The method is as follows: After you have made your stump and dissected away the bladder, instead of making an opening into the vagina, as suggested by Dr. Byford, simply cut open the cervix anteriorly right down into the vagina, and turn the mass inside out, exactly on the same principle as suggested in Porro's operation in Cæsarean section. The dilatation of the cervix is extremely difficult, but if you make an incision with one blade of the scissors in the canal and the other outside straight down into the vagina, and then turn the structure inside out, you have practically the same condition of things as Dr. Byford has spoken of. I merely mention it, sir, because I am under the impression that it was suggested about the time, or, probably, since Dr. Byford's procedure was broached.

Dr. Kelly.—Dr. Polk has given us a good account of a difficult class of cases; they are, however, those which I would classify under my third heading.

I have spent much time in trying to devise a means of handling the fourth class and avoiding the fatal hemorrhage, and the first thing which occurred to me was that there are but four channels through which hemorrhage can occur—two sets of ovarian and two sets of uterine vessels. If we could get right at these, all

would be well, but the great difficulty is that we cannot get near these vessels in the pelvis. In my efforts to locate the uterine arteries amidst the masses of tumors I have introduced a corrugated sound through the vagina into the uterus, making it easy when the abdomen is opened to discover the location of the uterine cavity, and thus approximately to know where the uterine arteries are, for they must lie on either side. This device, however, is not as valuable as it would seem at first sight.

More recently I have made some careful observations, with drawings in the dead-house, in my study of this question, and have settled upon the following plan in these atypical cases; to tie first the ovarian arteries and veins in their course above the pelvic brim in the abdominal cavity.

When the tumors are developed down into the pelvic connective tissue and behind the peritoneum, the main trunk of the uterine artery is usually unapproachable; I propose, therefore, to try to control this source of bleeding in such cases by temporarily compressing the abdominal aorta, while rapidly enucleating the mass, after which I will pick up all the large vessels in ligatures before removing the pressure from the aorta. In my operation, as above described, if after suturing the lips of the stump together, I observe any persistent oozing, I ligate at once the nearest uterine artery, and thus never fail to check the hemorrhage.

Do not forget when reading reports of successes by this or that *method* that it applies not to the treatment of fibroid tumors in general, but simply to this third class, in which the mortality should never be great under any plan.

The difficult fourth class cannot be treated by anybody's method. If any man has a method for these difficult cases, he owes it to the world to tell us exactly and minutely how he carries it out.

Dr. J. C. Temple, of Toronto.—I would just like to say one word, Mr. President, in reference to this operation. My experience in vaginal or supra-vaginal hysterectomy is not very extensive, inasmuch as I have never yet been able to convince myself of the justifiability of this operation from the number of cases in which it is performed. I see a great number of cases of tumor

of the uterus which are harmless to the woman in one sense, and she may go through life without a great deal of inconvenience, and I have seen women subjected to the risk of an operation, which is serious and dangerous, for the removal of the uterus for fibroids that were not doing a great deal of harm.

This discussion, it seems to me, is somewhat apart from the title of the paper, the different speakers having described their particular methods of operation. The question of Dr. Byford's paper is as to the advisability of bringing the stump through the vagina so as to effect complete drainage, and in this way prevent the peritoneal cavity from becoming infected. I have no experience with this operation of Dr. Byford's, have never seen it performed, and am hardly competent to offer an opinion ; but it seems to me the remarks of Dr. Skene bear strongly on this point, that after he has separated the uterus from its attachments, what is the use of leaving only a small part remaining; I do not see the objection of proceeding to remove the whole of the mass.

Drs. Polk and Dudley spoke of the difficulty of applying the forceps for removing the remainder of the tumor. I have not experienced very great difficulty myself, although I have in four cases removed the mas entirely and left nothing behind to infect the peritoneal cavity at all.

It seems to me that the operation of inversion of the cervix is difficult. I am satisfied that to invert a large mass through a dilated cervix is most difficult, and I am not at all in favor of that procedure.

The plan presented by Dr. Byford rather commends itself to my view, in suitable cases, as an easy procedure, where we do not propose to remove the whole of the tumor.

Dr. H. P. C. Wilson, of Baltimore.—We have all listened with a great deal of pleasure and instruction to this able paper of Dr. Byford and the discussion which has followed it, but time flies, Mr. President, and the hour has arrived for the delivery of the President's Address, and I would beg at this point to call for the same.

The President.—Will Dr. Byford close the discussion?

Dr. Byford.—I find there are one or two points in this discussion which should be a little better understood.

In the first place I did not say anything about drainage, it was merely reported in the case mentioned. The idea of my method is to close up the peritoneum below and drain from above.

I have been asked what I did with the broad ligaments and ovaries in these cases. I commence outside the ovaries and tie off every thing until I come down to the stump, whether it be above or below the internal os uteri.

In regard to the technique, it has been suggested that it is difficult to get into the vagina. It is a difficult thing, perhaps, in one's first operation, but you can put your finger down in Douglas's cul-de-sac and the thumb on the anterior vaginal wall, bring the fingers together below the stump, and have nothing but the vaginal walls between; thus you know the exact relationship of the cervix; then force the point of a pair of Keith's hæmostatic forceps down between the cervix and the thumb through into the vagina; when that is done the forceps can be opened so that they cannot slip out; then you can draw up the vagina and cervix with them, and enlarge the opening anteriorly and laterally with scissor-cuts.

I want to say a word in regard to the different methods of treating the stump from below. I notice that those gentlemen who have spoken of having experience in treating the stump from the vagina as well as from above, spoke of the great difficulties of inverting or taking out the cervix entirely: I wish to say I have had the same experience. I invented a pair of forceps for the purpose of clamping off the entire cervix from below, but I found great difficulty in applying them. Another objection is, you do not shut off the peritoneal cavity, as in the method I employ; and a still further objection is, that you remove, as it were, the keystone to the pelvic floor or roof, and leave an opening into which the intestines may settle and adhere. In inverting you have to reach a long way to the cervix from below with two fingers, and work at a disadvantage. Slitting the cervix open increases the mutilation and danger of hemorrhage.

As to the objection that it is unsurgical to leave a sloughing stump, I think that has been reiterated too often. Whatever will cure a patient and leave her in the best condition, is most

scientific in my mind. At the same time there can be no doubt that Dr. Kelly's method of doing away with the necrosis is an improvement, provided the operation is not lengthened too much, and too much suppuration is not produced.

In regard to the criticism that I could only treat the simpler cases, the third and fourth cases I had were extensively developed in the broad ligament. I hardly ever operate upon small tumors, but mostly large ones. In my second case there was practically no pedicle; the cervix scarcely projected into the vagina, and the large globular tumor started at the vaginal junction and filled the pelvis. After enucleation from the broad ligament I applied the ligature at the vaginal junction, then after cutting off the tumor I was able to enucleate the remainder and make my pedicle.

The principal feature of the operation is a complete closure of the peritoneum over the anteverted stump, and sewing up the peritoneum above it. When such sewing is impracticable iodoform gauze may be stuffed into the retro-vesical space over the anteverted stump and brought out into the vagina.

[Since writing this paper, I have operated in this manner with success.]

INJURIES TO THE URETERS DURING LABOR.

By Alexander J. C. Skene, M.D.,
Brooklyn, N. Y.

While engaged in obstetric practice, both hospital and private, I attended several cases which differed from any of the puerperal diseases recorded in obstetrical literature. Subsequently, more of the same kind were seen in consultation.

During the early years of my investigation very little was learned about these cases except that there was something in their pathology which was not known to me. More facts regarding the manifestations of the affection, as observed clinically, and a few post-mortem examinations led me to conclude that injury to the ureters during parturition was the cause of the phenomena which I witnessed in these cases. Having determined this point, I again turned to the literature, hoping to find the desired information, now that I knew what to look for, but without success.

This statement is made, first, to give a reason for bringing the facts to your notice; second, to seek for correction in case I have overlooked any contributions on the subject which should have been acknowledged; and finally, that the sources of information and the methods of investigation may have the benefit of your criticism.

The history of all the cases would occupy too much time, and it will suffice to give the prominent points in the history of those which are uncomplicated or typical and note the exceptions which have been observed in others.

The patients are usually primiparæ or at least have not had

many children, the labor having been tedious, instrumental or manual, and the progress after delivery satisfactory or fairly so. The lochial discharge has been normal and the secretion of milk also. The bowels act well and the kidneys apparently so. In some patients there is retention of urine or frequent and painful urination. Pelvic pain and tenderness in the lower part of the abdomen are present, but are not always severe at first. These symptoms become more acute after a time, the pain and tenderness increase rather abruptly, and a chill or rigor may occur at this time; distention of the bowels takes place, and the temperature runs up, and the pulse is also increased in frequency. Pressure shows increased tenderness, and bimanual manipulation of the kidney upon the affected side usually causes a sense of distress rather than acute pain.

The increase in the severity of the symptoms supervenes in from three to five days, and soon thereafter a quantity of pus, and sometimes blood, appears in the urine. When the discharge of pus begins the patient is generally relieved to some extent. The pain is less, and the temperature and pulse are reduced a little. In connection with pus and blood renal casts may be found, but this is not invariably the case. The pus continues to be discharged in diminished quantity for a week or more. The bleeding generally subsides in a day or so, and most of the cases gradually recover. In others acute disease of the kidney appears about the time that the pus begins to be discharged from the bladder, and uræmia follows and sometimes uræmic coma. Such cases end fatally, as a rule, but I have known one to recover.

In uncomplicated cases a vaginal examination gives negative signs, except that tenderness is detected high up on the side affected. When well-marked kidney disease is developed, the thought naturally occurs to one that it must have begun during pregnancy, and that the acute symptoms which follow labor are due to a sudden increase of a preëxisting nephritis. This, however, is not the case, as is shown by the fact that

several of my patients were known to be free from any renal disease up to the time of labor. The diagnosis of injuries of the ureters must be made by the exclusion of the more common puerperal affections, such as peritonitis, cellulitis, or general septicæmia. Metritis is excluded on the grounds that the lochia are normal, that there is absence of tenderness, and that involution progresses as it should. The symptomatic fever is too mild in character to indicate general peritonitis, and the physical signs of that affection are wanting. The tenderness on pressure on the side affected, and the constitutional disturbance not otherwise accounted for, are suggestive of cellulitis, but the evidence, in the way of physical signs, of that affection is insufficient, and the subsequent history effectually excludes it.

The sudden appearance of pus and blood in the urine leads one to suspect that an abscess has formed in the cellular tissue and discharged into the bladder. This is excluded on the ground that there have been no physical signs of cellulitis, and furthermore, an abscess never discharges into the bladder in so short a time after the inception of pelvic cellulitis.

In cases complicated with traumatic cystitis it might be presumed that an abscess had formed in the wall of the bladder, but that is excluded for the reason that the violent symptoms and physical signs found in traumatic interstitial cystitis are absent. In short, the history of injury to the ureters differs from that of any of the puerperal diseases found in medical literature, so far as I know. Although these clinical observations led to the presumption that injuries of the ureters might be the initial lesion, nothing definite was arrived at, except the determination to take the first opportunity to study post-mortem the pathology which gave the clinical histories obtained. In looking back, I am confident that I lost opportunities to pursue my investigations regarding the condition of the ureters in fatal puerperal cases. It was not until my attention was directed clinically to the subject that I sought for anatomical facts relative thereto.

The first post-mortem of value was that of a lady forty-three years old, who had a very large uterine fibroma which she had carried for years without being much embarrassed by it. She was taken with backache and some ill-defined constitutional symptoms, which, for the first time, compelled her to give up her duties to a great extent, but she did not seek medical aid. She died suddenly after a convulsion which was not very well described by the friends who were with her at the time. In fact there was no clear history obtainable. Post-mortem, I found a large fibroid, and in the cellular tissue around the upper part of the cervix uteri there was much œdema and what looked like an exudation. Both ureters were dilated and there were hydro-nephrosis and acute nephritis. All the other organs of the body were normal.

This case gave evidence of value, but not conclusive. Years after I found a case that had a history of ureteral and renal disease.

The patient died two weeks after confinement, and, post-mortem, I found an injury of the left ureter about an inch and a half above its lower end. Its walls were broken down so that they could not be separated from the surrounding tissue. It was occluded at the point of injury. There was a circumscribed exudation in the cellular tissue around the injured part. Suppuration had begun at the site of injury, showing that the starting-point of the inflammation was a traumatism of the ureter. Above the occluded portion the ureter was dilated and filled with pus and urine. There was acute nephritis on that side. There was inflammation of the ureter on the right side and some infiltration of the cellular tissue around it. The right kidney was also inflamed, or at least markedly hyperæmic. There was circumscribed cystitis of a mild character. There was not enough in the clinical history nor in the lesions found to indicate a grave form of septicæmia. The cause of death was, no doubt, uræmia.

This case recalled certain other facts that were of value. In two other post-mortem examinations which I had wit-

nessed, in cases dying after confinement, acute nephritis was found and in both the pathological changes were more marked in one kidney than the other, but no examination of the ureters was made, and I now feel inclined to think that the trouble in these cases began in the ureters. I have tried to obtain evidence from some of our pathologists on the subject, but most of them have confessed that while they always examine the kidneys and have on occasions found nephritis they did not investigate the ureters. However, from my study of the subject clinically, and the meagre study of the morbid anatomy, I feel warranted in stating that the pathology of this puerperal affection is a contusion or laceration of the ureter, by the head of the child, the hand of the obstetrician, or more often by the forceps. This contusion gives rise to swelling of the walls of the ureter and the cellular tissue around it, and perhaps some degree of inflammation. This is sufficient to obstruct the ureter and cause hydro-nephrosis and subsequently pyelitis. As the swelling, and perhaps inflammation, at the point of original injury subsides, the pressure of the urine and pus above forces a way through the ureter and relief follows. This is the explanation of the sudden discharge of pus with the urine. In case the obstruction lasts long the kidneys become involved to an extent that varies according to the duration of the obstruction. Whenever the ureter is completely blocked and remains so, there is nephritis, and then acute uræmia which may prove fatal as already stated.

In a given number of cases there are some in which there is cystitis, but no marked disease of the kidneys. In others the bladder is not involved but the kidney is, while in others all three organs, bladder, ureter, and kidney, are affected. When, as not infrequently is the case, there are some of the usual injuries of the cervix uteri, and pelvic floor, and metro-cellulitis follows, the ureters become secondarily affected. Under such circumstances, the order of development of the pathological lesions is reversed to some extent, and hence the

clinical history is changed so that the ureteral obstruction and consequent renal disease come later, and generally are less dangerous owing to being less acute and of shorter duration. This class of cases belongs rather to those discussed by Dr. Engelmann in his most valuable paper, presented two years ago to this Society, and I refer to it now rather to confirm his original views and to show the connecting link between the subject-matter of his essay and that now under consideration. In illustration of obstruction of the ureters, secondary to cellulitis, I may give the following case:

The patient suffered from menorrhagia; a sponge tent was used to dilate the cervix, after which curetting was practised. This was before I knew how dangerous and useless such tents were, and before antiseptic surgery was fully taught. The result was a circumscribed cellulitis on the left side. About the fifth day the constitutional symptoms increased decidedly, the pain extended upward on the left. There was difficulty in urinating, and the catheter was used. The urine was at first clear but rather abruptly became turbid. This led to an examination which showed the presence of pus. I supposed that a cystitis had been caused by the use of the catheter, but further investigation proved that the pus came from the ureter and kidney. The case was under observation at the time when I was learning how to tell when pus or blood, that was found in the urine, came from the bladder or kidney; and, I, on that account, made a number of examinations, all of which indicated that the trouble was in the ureter and kidney. A friend, who also examined the urine, made the diagnosis of pyelitis and acute nephritis. The cellulitis ended in resolution, and the patient recovered and has remained in good health.

This case, while not a puerperal one, shows very well what occasionally happens in pelvic inflammations following labor, and is so closely allied to the subject under consideration that it reasonably comes in in this connection. This leads to a convenient classification of diseases and injuries of the ureters:

First. Injuries of the ureters during labor.

Second. Obstructions of the ureters, secondary to other pelvic inflammations.

Third. Obstructions due to neoplasms and uterine displacements. The second and third are taken from Engelmann.

Causation.—There are certain conditions which predispose to injuries of the ureters during labor. When the bladder and terminal ends of the ureters rest low in the pelvis toward the end of gestation there is more liability to their being caught between the child's head and the brim of the pelvis during labor. In many cases the ureters suffer some impairment of nutrition during gestation and are more susceptible to injury that is produced by passive hyperæmia and œdema, and hence a softened state of the pelvic tissues follows. There is in such cases a want of elasticity and resistance to injury. This is seen in the friable condition of the cervix uteri, vagina, and pelvic floor, which render them so easily damaged. In brief, then, the location of the bladder and ureters, the preëxisting lesion or functional derangement of the ureters, and malnutrition of the tissues in the pelvis, are the conditions which predispose to graver injuries during labor.

Direct Causes.—The fact that the ureters escape injury when dilatation of the cervix uteri is complete before expulsion proceeds, gives a clew to the causation of such injuries. When the membranes rupture before dilatation is complete, and consequently the cervix uteri and bladder are carried down into the pelvis before the advancing head, the ureters are exposed to undue pressure and traction also, and hence are sure to be more or less injured. The dangers are much greater when it is necessary to use the forceps or perform version under these circumstances. The presence of hard fæcal matter in the rectum may also be mentioned among the causes. Faulty methods of operating, no doubt, add to the dangers. Undue lateral motion of the forceps during extraction must certainly do more or less damage to the adjacent tissues and ureters. Especially is this likely to occur if the

cervix uteri and bladder are permitted to descend before the advancing head.

Treatment.—These injuries being difficult to manage their prevention is of prime importance. When the presence of renal trouble is detected before labor, and it is presumably due to partial obstruction of the ureters, much may be done by rest in the recumbent position, the judicious use of cathartics and diuretics, and vaginal douches. By improving the circulation and general nutrition of the organs and tissues, the existing ureteral trouble may be relieved and further injuries avoided. During labor much may be accomplished. Full dilatation of the cervix before rupture of the membranes, so that the bladder and ureters may rise out of the pelvis when the head descends, insures comparative safety. In view of these facts the judicious obstetrician, being fairly conscious of the danger to the ureters, will find an additional reason for looking after their interests.

My attention was first given to this matter in order to save the bladder from contusions and displacements, and later I found that this was one of the surest ways of saving the ureters also.

I have many times called attention to the necessity of supporting the bladder during labor and indirectly the ureters also, but so much attention is bestowed upon the management of the perineum, that the more important dangers to the urinary organs have been largely ignored. This supporting of the parts during delivery should be more carefully watched when delivery with forceps is practised.

Lacerations of the cervix uteri and pelvic floor are important misfortunes, but they do not compare with injuries of the ureters in gravity of results. The fact is that the possible danger to the ureters has not occurred to obstetricians, as a rule, but when fully appreciated will have due attention. The lateral motion of the forceps, referred to, is happily not necessary, nor is it practised by experts, I believe, but still it should be avoided for the sake of the ureters

as well as for the reasons given in obstetric works. This would be an uncalled-for statement were it not for the fact that while the science of obstetrics is most mature, and the art practised by the few in a perfect way, yet the practice of many is often insufficient, to say the least. There is much more that might be said about the preventive treatment, but as my object is merely to bring the subject to your notice, I may forbear.

The management of injuries of the ureters which have occurred is, I fear, in a very immature state. At least, I have never read or heard of any suggestion regarding treatment and can only give the results of personal observation.

Being without precept or example, and for years not knowing the pathology of the cases under observation, I treated them as inflammatory affections without special regard to the location and character of the inflammation, for that was unknown. When a clear comprehension of the nature of the affection was obtained the treatment was still rather expectant. There is one thing which has appeared to be of advantage, and that is, keeping the bowels free. In fact free catharsis may be tried if the patient is able to stand it. This I discovered by seeing a case in consultation, in which the attending physician, suspecting septicæmia or obscure peritonitis, had adopted the modern treatment—saline cathartics. The results were good and I feel confident that it is useful. When the bladder is involved, much is gained by washing it out repeatedly; this relieves the pain in the ureter and kidney to some extent. Retention of urine for an unusual length of time increases the suffering and no doubt increases the traumatic inflammation. The use of the catheter does much good if used by a skilled nurse or obstetrician. The unclean metallic catheter, in general use when I first observed such cases, always did harm. Hot vaginal douches have been tried, and when they relieve pain they are curative, but when they increase the suffering at the time of their use or immediately after, as is often the case, harm may result. In a

word, the treatment has been to relieve pain, sustain the patient, and trust that the damages would be repaired before the kidneys were fatally involved. The question of surgical treatment has occupied some time and thought without my arriving at any definite conclusions.

Catheterizing the injured ureter seemed indicated but I have had no experience with it in acute injuries, because I gave up obstetrics about the time that the practice of catheterizing the ureters was introduced, and I had not acquired facility in the operation; and lastly, I doubted the safety of such treatment, and felt that it should be tried by an expert first, if at all.

In the class of cases due to inflammation of the tissues around the ureter, the use of the catheter, in the hands of an expert, would be of the greatest value. This has been proved by Kelly, Engelmann, and others, but when the ureter is the primary subject of the injury, it is doubtful whether catheterization would be possible, and there would be much danger of the instrument perforating the ureteral wall.

DISCUSSION.

Dr. W. W. Jaggard, of Chicago.—Injury to the ureters during labor is a very uncommon occurrence, although it is not extraordinary during pregnancy. Plane frozen sections indicate that the pubic segment of the pelvic floor is drawn upward, and that the bladder during the latter part of the first stage of labor, and almost always during the second stage of labor, is an abdominal viscus, and that, therefore, the ureters are withdrawn from the operation of pressure by the head of the child. Forceps applied before the engagement of the head or dilatation of the cervix, before the conditions for the forceps operation are present—may result in injury to these organs, but such an injury I believe to be very uncommon. On the other hand, there is abundant evidence that during pregnancy the ureters may become seriously involved and that very frequently an abnormal

condition of the ureter existing before pregnancy may be intensified by pregnancy.

Obstruction to the flow of urine through the ureter, as one of the causes of eclampsia, was noticed in 1878, by Halbertsma, and many years before Morgagni had drawn attention to the same fact. Compression of the ureters, and uræmia and eclampsia as a consequence, has been noted by several German observers. I have observed one case in which it was shown that compression was the principal causative element in the eclampsia.

Among the causes specially operative during pregnancy may be mentioned increased intra-abdominal tension rather than direct pressure of the gravid uterus. Calculous pyelitis is a much more common condition during pregnancy than is generally believed, and in many cases of abnormal condition of the ureters you will discover small calculi whose presence you would not suspect unless you had a good deal of experience in palpating the ureters, and unless your anatomical observation at autopsies is particularly exact and critical. I remember two very interesting cases that Dr. Byford demonstrated before the Chicago Gynecological Society, and I have myself observed a case of ureteral calculus which was the probable origin of dilatation.

Catheterization of the ureters during the puerperium is difficult, dangerous, and very seldom necessary. Pawlik is the only individual I know who can attempt it with impunity. The examination of the urine and palpation of the ureters per vaginam, with physical exploration of the lumbar region, will reveal all the necessary facts.

Dr. A. W. Johnstone, of Cincinnati.—This is a very interesting subject to me because I have twice found very serious disease of the ureters, once proving fatal, and causing me to lose one of my first cases of laparotomy. It was a case of very large multilocular ovarian cyst in which the patient developed furious mania about forty-eight hours after operation. At the post-mortem I found that from the point at which the tumor pressed on the ureter as it passed over the pelvic brim, up to the kidney the ureter was enlarged so much that I could run my finger back and

forth in it. There was purulent inflammation of the duct and hilum of the kidney, and the kidney itself was very seriously disorganized, but from the point of pressure down to the bladder the ureter was normal. The opposite ureter was all right.

I believe if we will analyze these cases of mania we will find that a certain proportion of those following laparotomy are due to some such condition. Another serious disease of the ureters which I once saw was in a case of general tuberculosis. I only speak of it here to put myself on record. It was that of a young girl supposed to be dying of phthisis, though she had obstinate cystitis, which was the only local trouble I could find. There was no complication of the lung, but she presented all the symptoms of tuberculosis. Post-mortem I found the bladder invaded with milary tuberculosis, and the ureters, hilum of the kidney, and the kidney itself were studded with miliary tubercles. I only state these cases in order to emphasize the importance of not overlooking the ureters, as they are a frequent source of mischief in gynecological work.

Dr. Howard A. Kelly, of Baltimore.—It gives me special satisfaction in exhibiting this ureteral catheter, to state that I believe that I was the first to introduce the instrument, and to catheterize the ureter free hand per urethram in this country. This is Pawlik's catheter which I have slightly modified. (Instrument submitted.)

Dr. Henry T. Byford, of Chicago.—I would like to call attention to the fact that this subject of ureteral disease is one that is bound to be developed. We must be able to separate deaths from ureteral troubles from those due to disease of surrounding organs. I have seen one case of cancer of the uterus die of uræmic convulsions. In many cases in which death occurs the immediate cause is from some obstruction of the ureters, whereas the death its put down by the ordinary practitioner as due to the primary disease which caused the occlusion of the ureter. We also find in many post-mortem examinations, the ureter occluded in cases in which there is reason to believe that this hastened death.

With regard to catheterization of the ureter I believe that this is a subject which will also be greatly developed. No medical

student or young graduate without practice can, for the first time catheterize a urethra without danger of injuring it, and the catheterization of the ureter is not very different.

Dr. Kelly.—This discussion ought not to close, Mr. President, without the additional observation, that in advanced pregnancy the ureter which is normally felt against the pelvic wall is very easily felt against the head of the child presenting downward; anyone can notice it in advanced pregnancy, particularly in the puerperium.

Dr. Skene.—It is hardly necessary, Mr. President, for me to say anything more by way of closing the discussion. I have attained my object, which was to call attention to the subject so that more work might be done in this direction. I think that sufficient interest has been excited in the Society to warrant us in believing that more attention will be given to it in the future.

In reference to the remarks made in the discussion as to the importance of the ureters, and their relation to pelvic diseases and their conditions and diseases during gestation—that of course is all foreign to the paper which I read. My object was to add to what we know on the subject by pointing in another direction, and I really think that while much attention has been given to the diseases and injuries of the ureters during gestation, and in other pelvic diseases, as noted by the gentlemen who have referred to it, not much of anything so far as I know (and the discussion has not brought out anything that is new, I think) has been done in reference to the injuries during labor; that, you remember, is the point which I endeavored to deal with.

In reply to some of the remarks made by Dr. Jaggard, I may say that I recognize all that he has said about the conditions of the ureters during gestation, but I am perfectly confident that they may be, and sometimes are, in as perfect condition as possible, and still they sustain injury during labor. There the trouble begins, and ends in recovery or death, as the case may be. I feel very confident of that from cases which I have observed, and that is the class of cases to which I wish especially to call attention.

IS THE MORTALITY AFTER GYNECOLOGICAL OPERATIONS AFFECTED BY SEASON?

By Henry C. Coe, M.D.,
New York.

The writer was led to seek the true answer to this question purely from a personal desire to compare his early teachings in gynecology with the experience of others who had been trained in different schools. The fact that a careful review of the records of a single institution with which he is connected, devoted exclusively to gynecological work, showed that between the years 1880 and 1890 nearly one-fourth of the whole number of deaths occurred during the months of February, March, and April, and that in the majority of the cases these were due to sepsis, seemed to confirm the view that the spring was a season peculiarly unfavorable for operations.

In order to test this theory, the following questions were addressed to a number of specialists in this country and abroad:

"1. Have you noted any increase in your mortality, either in hospital or private practice, during any particular month or months?

"2. If so, do you attribute this fact to climatic influences, or to the greater prevalence of sepsis at the season in question?

"3. Have you ever suspended, or limited, your operative work during any month or months because of the increased mortality?"

Of the two hundred gentlemen to whom circulars were sent over one-half replied, among them the most prominent

gynecologists here and abroad. The writer takes occasion to acknowledge the uniform courtesy which marked the replies, some of which were at considerable length, and will be referred to later. To the first and second questions one hundred replied decidedly in the negative. The majority of these also gave a negative reply to the third question; the others uniformly stated that they suspended their operative work during the summer, but *not* because they feared any worse results at this season. Only fifteen answered the first question in the affirmative, twelve mentioning the months of February and March, two January, and one the late summer. It is significant that not a single operator had noticed any difference in the mortality in private practice, so that we may confine our attention entirely to hospital cases.

Four believed that the increased mortality was due purely to atmospheric influences, eleven to the greater prevalence of sepsis, and four to a combination of both. Two well-known American gynecologists believed there was a greater tendency to pelvic inflammation during February and March. A few were inclined to attribute the increase of sepsis to the greater "humidity," "constitutional depression," "greater liability to catching cold," but the majority expressed, either directly or by inference, the view that hospitals were apt to be in a less perfect sanitary condition during the late winter and early spring.

Only six replied to the third question in the affirmative, and of these one limited his abdominal surgery alone, and two had no fixed rule with regard to it. Two gentlemen, who had formerly found it necessary to limit their work during the months in question, had observed that since they had adopted strict antiseptic precautions there had been no difference in the results at any particular season.

Some of our most prominent operators still showed the influence of their former belief in atmospheric influences by expressing a "general preference for other months," at least

in cases of laparotomy, though without any well-defined reason.

It should be stated that many prominent American surgeons suspend their abdominal work (especially in private practice) during the summer; a few because they fear the depressing effect of the hot weather, but the majority because they take their vacations at this time of the year. The results, as shown by hospital statistics, are as good as they are during the winter.

Several gentlemen, who have had a large experience in obstetrics as well as in gynecology, called attention to the fact that puerperal fever was formerly more prevalent during the early spring, but that under modern precautions the influence of season had been shown to be *nil*. As Dr. Emmet pointed out twenty years ago, there was an intimate relation between these outbreaks and increased mortality in surgical wards, which is readily explained in the light of our present knowledge of the transmission of septic germs.

It is evident that this brief study has yielded less results than the writer anticipated at the outset. There is such a unanimity of opinion in the negative that no room is left for discussion. Even the few who seem to recognize seasonal influences either present no good reason for their opinion, or admit that sepsis is after all the real factor; while the half-dozen who limit their operations during the early spring, do so more from a laudable desire to give their patients the possible benefit of a more favorable season, than from a clearly defined belief that operative work is contra-indicated on account of the time of the year. All the laparotomists of widest experience are ranged on the side of those who hold that atmospheric influences have nothing to do with the results of gynecological operations. Many of these admit that they once leaned to this belief, but that during the past five or six years—that is, since the general adoption of antiseptic methods—they have entirely abandoned this idea. Still, it must be admitted that all surgeons (sometimes by

force of their surroundings) are not equally strict in their precautions in hospital practice, so that they may continue to have epidemics of sepsis, which seem to be most prevalent at certain times of the year. These will, doubtless, soon be eliminated even by the most conservative.

The writer's experience agrees with that of the few gentlemen who have noted an increase in the mortality after gynecological operations in hospital practice during February and March, and who believe that it is due to the greater prevalence of sepsis at this season. That peculiar atmospheric conditions have any special influence he does not believe, except so far as they may favor the development of occasional acute pulmonary complications. The fact that there may be unhealthy seasons (as during an epidemic of influenza) does not alter the case in the least. It is a significant fact that several of the gentlemen who replied at length to the above queries, acknowledged that they formerly regarded the spring as especially unfavorable for operative work, but since the introduction of modern aseptic and antiseptic precautions they had entirely abandoned this view.

It may be taken for granted, then, that according to the general opinion sepsis is the cause, and the only cause, of a relatively greater mortality in hospitals during any particular season, and especially during the spring.

Is there any foundation for the belief that this sepsis is due to the season itself? Is "humidity," or "constitutional depression," or "a greater tendency to pelvic inflammation" a prominent etiological factor during February and March? Is there any truth in the idea that epidemics of puerperal fever and infectious diseases being more prevalent in the early spring, therefore gynecological operations (especially major ones) are attended with greater risk? The accumulated evidence must lead us to reply in the negative. Granted that according to the older writers the system is more depreciated at this time of the year, that does not affect the development of sepsis, though the patient may sometimes be less able to

resist it on account of such depreciated vitality. But, from what we now know of the causes and prevention of septic infection, it is impossible to understand why it should be more dreaded at one time than at another. With regard to the coincidence of epidemics of puerperal fever and increased mortality after operations, we can only add that the former have become things of the past, their disappearance being simultaneous with the intelligent application of antiseptic principles to gynecology as well as to obstetrics. The precautions adopted by modern laparotomists effectually guard against the danger from epidemics of other infectious diseases, such as erysipelas, diphtheria, or scarlatina. It follows that any increase in sepsis is due to a failure to guard against it, either by the elimination of sources of infection, or by the adoption of proper precautions during the operation. That such sepsis is most prevalent in some hospitals in which instruments and operating-rooms are in constant use by several operators, with different assistants and groups of spectators, is clearly due to the fact that after a busy winter, when such operating-rooms and wards are more or less infected, there succeed two or three months (which are always active ones) in which antiseptic precautions are relaxed. Warned by increased mortality, fresh precautions are taken, and, with greater cleanliness, the results during succeeding months again return to the usual standard. We need not go farther for an explanation; it is perfectly simple. As Dr. Bantock pertinently remarks in a personal letter to the writer: "When I lose a case I can always account for the result by one of three things, viz., something that I have done, something that I have omitted to do, or something that it was impossible to do." In short, the time is past when we need to interrogate the earth or the air for the causes of death after operation which lie within ourselves, and, so far as regards its influence, we may be indifferent as to whether the month is October or March.

DRAINAGE AFTER LAPAROTOMY.

By Thomas A. Ashby, M.D.,
Baltimore.

The tendency of the age in which we live is to run after methods and ideas of novelty and originality. This marked characteristic of the intellectual aim of a progressive civilization applies with striking force to our habits of scientific and clinical work. This Society has manifested just such traits in the investigative work which it annually presents in its volume of *Transactions*. It is, perhaps, due to this fact that its influence upon the medical thought of this country and of other civilized countries, in the department of gynecology, has been so noticeable and so distinguished. It is not my purpose to depreciate this distinguished feature of the annual work of this Society. It has its useful and beneficent purpose, and is a subject for encouragement rather than of criticism. The observation I wish to present, by way of comment rather than by way of disapproval, is the fact that in our supreme regard for original work and for original ideas and methods, we are inclined to overlook the consideration of minor and ordinary clinical conditions which bear very important relations to the results of our work. As much as we may profit by the original work which is presented to these meetings we may, in my judgment, equally profit by a more careful clinical study of conditions which we tacitly accept as well-nigh perfect and lacking in practical value for further study and discussion.

In the subject which I have brought forward I may possi-

bly trespass upon important time and weary you with a regard for seemingly unnecessary details. My apology for such assurance upon my part is a selfish desire to learn from the experience and views of others that which is more or less imperfectly impressed upon my own. I have convictions based upon a personal study and observation which need disapproval or confirmation. The purport of this paper is to assent, not to assert. I feel more willing to receive than to give, reversing the Scriptural injunction.

In my early laparotomy work I invariably closed the abdomen after completing the toilette of the peritoneum with scrupulous care. These cases recovered with but one exception, after some days of high temperature and indications of localized peritonitis and sepsis. These conditions I attributed to surgical fever and accepted as a necessary result of intra-pelvic surgery. I was satisfied so far with the method of complete closure of the abdominal cavity after simple procedures, and I am satisfied would have gone on with this practice had not my attention been attracted to the very marked value of the drainage-tube by a most trying experience.

Case I.—In September of last year I removed from the pelvis of a woman, aged twenty-eight years, a pus-tube of enormous proportions, containing over one and a half pint of pus, and so distended that it occupied every available space in the pelvis. It was adherent to intestine, omentum, bladder, uterus, and pelvic wall, and had to be shelled out of its position with great difficulty. Much lymph and débris were unavoidably left behind after as thorough cleansing as was possible. In closing the wound in the abdomen I left in a glass drainage-tube and frequently during the day, for the subsequent three days, washed out the pelvis until the washings gave no evidence of pus. On the fourth day the glass tube was removed from the pelvis, but a short, soft rubber tube was left in the abdominal opening to prevent closure. Through this smaller opening the cleansing of the well made by the tube was accomplished. On the fifth day the rubber tube was removed and the abdominal opening was

left to close spontaneously. The patient's temperature had not risen higher than 100°, but her general condition was greatly depressed, nausea and vomiting had been incessant, and it became necessary to attempt her feeding by the rectum. I ordered an enema of one pint of warm milk per rectum on the morning of the sixth day, and instructed the nurse to be extremely careful in giving the injection, to use no force, and to proceed very slowly. To my surprise and chagrin, on dressing the wound in the afternoon, the milk given by enema and small particles of fecal matter were found in the dressing. A fecal fistula had been established in free communication with the abdominal opening. Fortunately for my patient, an outlet had been provided and the peritoneal cavity was saved from this unforeseen flooding. As embarrassing as this complication appeared I did not despair, for drainage was good, and thorough cleansing of the fecal tract was possible. After three weeks of careful washing and attention the tract closed spontaneously. The patient, after some six weeks of extreme illness, recovered and was restored to complete health.

Here the drainage-tube not only kept down temperature and septic trouble, but provided a safe way of escape for a bowel-opening neither anticipated nor feared up to the time of its occurrence. Had the abdominal opening been closed on the fourth day, as every indication warranted me in doing, the discharge would have been intra-peritoneal, and probably fatal in a few hours. Its prompt recognition through a free opening saved the woman's life.

Case II.—A similar experience happened in the treatment of a case from whom I removed an enormous hæmeto-salpinx. The tumor filled the entire pelvis and contained over two pints, estimated, of blood-clots and serum. It was adherent everywhere, and was removed with great difficulty. Thorough washing and cleansing of the cavity were not sufficient to dispose of all of the débris of the tumor wall and adhesions. Profiting by previous experience, I used the glass drainage-tube, and for six days employed frequent ablutions. This tube was then removed and one of soft rubber was made to take its place. Daily, and by degrees, the tube was shortened until the well was filled in and only the

abdominal opening kept free. I was on the eve of removing the short tube when on the fourteenth day I detected the odor of fecal matter in the dressing, and found the stump of the pedicle as a foul slough in the wound. This was drawn out with a pair of forceps, and then a fecal opening freely discharged. Thorough cleansing and attention brought a satisfactory result. The fecal tract closed spontaneously in the course of six weeks, and the patient made a recovery. Prior to the operation her temperature ranged from 101° to 104°. She had localized pneumonic consolidation in both lungs followed by softening, and was regarded by her family physician as in the last stages of consumption. Her temperature fell immediately after the operation to 99°, and did not rise beyond 101° thereafter. Her lungs cleared up and her general condition has been one of steady improvement from the morning subsequent to the operation to the present time. Here the drainage-tube again saved a life, and here the delay in its contemplated removal prevented a reopening of the abdomen, if not a fatal termination.

It is quite evident that in the cases here related there was the strongest indication for the employment of the most careful drainage, and the surgeon would have been derelict in duty not to have employed it under such circumstances; still, in my judgment, the lessen taught by these cases loses none of its force, in view of the fact that the indications for the withdrawal of the tube and closure of the orifice were as pronounced as those which had previously called for its employment. The deduction which I would draw from this experience is the fact that we should not be in too great haste to close the abdominal opening after having used the tube. It may be kept open with safety for some days by the use of a simple glass or rubber stem, such as is used after the operation of forcible dilatation of the cervix uteri. The stem should be removed frequently and be kept thoroughly aseptic. It acts as a stopper which, when withdrawn, admits of thorough intra-pelvic cleansing by the use of the long-nozzle, hard-rubber syringe.

Experience has taught me that drainage after laparotomy

for the removal of ovaries and tubes, after simple ovariotomy, and even after minor surgical interferences within the abdomen, is attended with very few disadvantages. Whenever the abdomen is opened for the treatment of intra-pelvic conditions adhesions are frequently disturbed, bloodvessels are often torn, and points for the leakage of blood, serum, and inflammatory exudates remain. In the simplest cases such resultants after a laparotomy may be successfully disposed of by the reparative processes, and even in grave cases similar results are obtained, yet it is plain to my judgment that whilst nature may accomplish this purpose with satisfaction in the majority of cases, conditions arise which teach the lesson that this duty should not be entrusted to nature under all circumstances. I may suggest the inquiry whether drainage is not the safest and surest method of disposing of these products in the vast majority of cases, the exceptions being reserved for exploratory incisions and for the removal of the most simple growths and conditions. The fact that recoveries follow the method of primary closure of the abdomen in a large percentage of cases does not weaken an argument which might show a larger percentage of results by the employment of drainage. I have observed in my work that where the abdomen was closed primarily the case progressed with a higher temperature, with more pronounced nausea, and with indications of a higher inflammatory action within the abdomen. The pain after the operation was more pronounced from the mechanical presence of the tube, but this was compensated for by less distention of the abdomen, less tympanites, and less gastric uneasiness. In those cases in which I have employed drainage, even after simple procedures, I have been impressed with the fact that from twenty-four to forty-eight hours ofter the operation decided evidences of slight intra-pelvic bleeding were recognized in the discharges from the tube. Inflammatory exudates were cautiously withdrawn through the tube, thus relieving the peritoneal membrane of the presence of material capable of generating sepsis or of

promoting inflammatory results. By the process of drainage no material is left for absorption, for decomposition, or for pus-formation. To repeat, the temperature is lower, the circulation is more quiet, and the general condition of the patient is improved.

The method which I employ possesses nothing original. Its entire scope is expressed in the words asepsis, prudence, and carefulness. After completing the toilette of the peritoneum, I introduce the abdominal suture as for complete closure. After tying the upper four to six stitches, according to the length of the incision, I tie the two at the lower angle, and between these insert the perforated glass tube until the distal end rests easily in the pelvic fossa. The remaining sutures are now drawn until the incision is closed with the tube in position. A suture is introduced and temporarily tied so as to close the orifice, if it is found desirable to remove the tube or to introduce a smaller one. This expedient I find very convenient when a withdrawal of the tube is contemplated within a few hours. And just here I will remark that I have never observed a ventral hernia following the use of the tube, as has been complained of by some observers. When the abdominal wound is closed with the tube in position, as here described, I withdraw from the tube with the syringe every particle of water, blood, or serum which has drained into it. I next close the external orifice with an absorbent cotton stopper, iodoform gauze, and absorbent cotton and binder as after all laparotomies. The patient is then treated as under similar circumstances for laparotomy. The tube is watched for indications of leakage or hemorrhage. This latter condition may be thus early recognized and estimated without serious consequences to the patient, as must follow where symptoms of intra-pelvic bleeding point to the possible necessity of reopening the abdomen and religation of vessels. Every four to six hours, either in person or through intelligent assistants, I have the contents of the tube drawn with the syringe, and the tube and abdomen washed out with asep-

tic solutions as the indications warrant. The glass tube is removed within twelve, thirty-six, forty-eight, or seventy-two hours, just as indications and conditions demand. A clean and pure condition warrants an early removal, other symptoms being in accord. A foul and copious oozing of bloody serum, débris, or pus necessitates a prolonged retention. I regard it as grave an error to leave the tube in too long as to remove it too soon. Here intelligent judgment must fix the rule of action. After the removal of the glass tube I do one of three things, I withdraw the tube absolutely, I introduce an aseptic perforated soft-rubber tube, or I place in the opening a glass or hard-rubber stem simply to prevent entire closure of the orifice, and to favor its gradual retraction so that communication is maintained with the abdominal cavity, and an outlet is provided for material which it may prove desirable to remove. The advantages of drainage cannot be gainsaid in any condition of intra-pelvic sepsis. The presence of high inflammatory action or of pus-formation after a laparotomy are as undesirable as any symptoms which can arise. After the immediate dangers of a laparotomy, such as shock and hemorrhage, have subsided, the remote conditions which destroy life may be referred to peritonitis and septicæmia in the vast majority of cases. The surgical mind is ever suspicious of sepsis.

The methods and agencies for preventing sepsis have called into existence the so-called antiseptic system of surgery, and yet in spite of the teachings of this system its employment is almost universally confined to the period of operative intervention. The laparotomist cleanses the apartments in which he operates with scrupulous care, the patient is treated with the same cautious consideration. Every detail for the prevention of sepsis is conducted up to the very point of complete closure of the abdomen, and yet in spite of such precautions sepsis often supervenes. One is puzzled to account for its origin upon any other hypothesis than the assertion that something has been introduced into the abdo-

men, and left there capable of establishing such influences. We cannot exaggerate the importance of asepsis in every step of the operation up to the point of complete closure of the abdomen. When this point has been reached may we not tarry and consider whether in the complete closure of the wound we are not shutting out from observation and careful management a possible septic surface which could be managed to far better advantage by a method of continued drainage and prolonged aseptic precautions?

The questions I would ask for intelligent discussion are: 1st. What are the dangers and disadvantages of drainage? 2d. What are its uses and advantages? 3d. Are more lives saved than lost by its cautious and intelligent employment? I have not investigated this subject in a statistical way. I have personally refrained from any reference to the work of others. I am presenting my own limited experience, and I venture to say that drainage is perfectly safe when intelligently employed, that it secures cleanliness and asepsis within the abdomen, that it provides a way of escape for intra-abdominal products, that it keeps the surgeon informed in regard to conditions going on within the pelvic cavity, and lastly, that it reduces mortality.

If the foregoing propositions are tenable then it is pertinent to inquire whether the system of drainage after laparotomy is as generally and specifically employed as it should be? I have had no way of collecting reliable statistical data upon this point, and I therefore hope that a discussion will follow which will indicate the experience and opinions of the members of this Society upon the points I have presented. So far as my individual experience extends I am a convert to the view that drainage after laparotomy is a most essential step in the successful conduct of intra-abdominal work. I am further convinced that its employment is too restricted in the practice of intra-abdominal surgery, and that there is need of a more careful study and consideration of the advantages which it presents.

If the method of drainage after laparotomy can be shown to exercise a direct and immediate influence upon the mortality statistics of abdominal surgery it commends itself at once to the intelligent judgment of the humane surgeon. If in addition to this it can be shown that the convalescence following intra-abdominal work is marked by a lowered temperature, by improved circulation, by a reduced general depression, and by a comparative freedom from intra-abdominal inflammation and sepsis, we have the strongest ground for its employment even in those minor conditions of laparotomy in which the method of primary closure has been successfully practised. These are the considerations which I present for a candid and intelligent discussion by this Society in no spirit of dogmatism but with the earnest hope that I may profit by the large experience and views of men who can speak with authority and in no uncertain language.

DISCUSSION.

Dr. Hunter Robb, of Baltimore.—Drainage after abdominal operations is a question of the greatest importance. For the past two years I have been particularly interested in the management of the drainage-tube. I feel convinced that its proper use has been a most important factor in raising abdominal surgery to its present status. With a still wider appreciation of its advantages many lives which are being sacrificed yearly would certainly be saved.

Hippocrates makes mention of hollow pencils, and Galen describes leaden tubes for drainage. Heister, of Nürnberg, 1731, in his work on surgery, p. 85, recommends the use of a wick-drain in all abdominal wounds until the discharge became perfectly healthy. From the standpoint of to-day, however, Chassaignac, of Paris, in his treatise published in 1859, *Traité Pratique de la Suppuration et du Drainage*, settles the principles of drainage upon a broad scientific basis, and is, therefore, generally accounted the discoverer of the same. Here the rubber drain first made its appearance. With Koeberlé, of

Strasburg, originated the glass-drain now so universally employed in abdominal surgery.

The past winter I have particularly interested myself in bacteriological experiments made with the secretions collected in the tube.

Drainage is to be employed to meet the following conditions:

1st. To provide a means of escape for the serous oozing which follows the separation of broad adherent surfaces.

2d. To guard against septic peritonitis from retained pus from the tube, ovary, or other viscus.

3d. To remove the fluid in cases of persistent capillary hemorrhage.

4th. To provide against secondary hemorrhage in cases of hysterectomy, when the pedicle is dropped.

5th. To drain the peritoneal cavity, and starve out the disease in cases of chronic or tuberculous peritonitis.

Koeberlé's glass tubes, with trifling modifications, are still the best. These are straight and curved, of a length varying from 12 to 15 cm., and a diameter of 8, 10, and 12 mm., all lengths being made of these diameters. Every tube should be perforated with 9 to 12 holes, 1 mm. in diameter, extending from the lower end one-third the length of the tube. It is an important point not to have these holes larger than 1 mm. in diameter, to prevent the omentum, and even the intestine, from working into the lumen of the tube. Place the tube in Douglas's cul-de-sac, just behind the uterus, so that it will drain the fluid which accumulates in the most dependent portion of the pelvis.

Wick, gauze, or cotton, thoroughly sterilized, and placed so as to drain from the bottom of the tube, will keep up a steady capillary flow. Of these substances ordinary lamp-wick is the best; next to this stands gauze, twisted into rolls, just large enough to enter the tube easily.

In cases of extensive injury to the cellular tissue of the pelvis, where we wish to control the hemorrhage and at the same time drain, the following plan is worthy of trial: Take long strips of 5 per cent. iodoform-gauze, 3 cm. in width, and pack this around the uterus, bringing the end out at the lower angle of the

wound; or where pressure is desirable we can pack the gauze in coils in the form of a spring, bringing one end out through a drainage-tube, and regulate the amount of pressure by the abdominal binder. In order to remove such a pack it is only necessary to raise the tube slightly and pull the gauze through the tube layer by layer. Employed in this way there is no danger of pulling out the intestines or omentum with the dressing. If the tube is carefully placed, and the capillary drainage properly arranged, a continuous flow will take place, and it will not require the frequent cleansing as advised by some.

Removing the dressings frequently exposes the patient to the risk of septic infection. The tube can take care of itself for a period of from twelve to twenty-four hours. In fifty cases thus drained this point has been thoroughly tested by allowing the tubes to go without dressing for twenty-four to forty-eight hours, and in no case was a single unfavorable symptom observed.

Hands, instruments, and dressings employed when dressing the tube must be perfectly clean; the importance of this is very exceptionally appreciated, and accounts, I feel positive, for the septic infection that at times follows the use of the tube. The forceps devised by Dr. Kelly for cleansing the tube have proven very valuable in facilitating rapid, clean work. By catching pledgets of cotton with the forceps the tube can be thoroughly cleansed. This is a much safer and cheaper method than the use of a suction apparatus, which is not efficient and is at once contaminated and unfit for further use.

It is a good rule to rotate the tube three times at each dressing, and thus obviate the danger of any portion of the omentum, or even the intestine, becoming incarcerated by slipping through a perforation of large calibre in the tube.

The decision as to how long the tube shall be left in the abdomen is difficult in some cases. It is safer to drain too long than too short a time. As soon as the fluid is only enough to wet the plug in the tube it may be removed with safety. This point is generally reached in from twelve to twenty-four hours, or in some instances as late as the fourth or fifth day.

The early removal of the tube relieves the patient of discomfort and anxiety. It also allows the tissues of the tube-track

to collapse, promoting immediate union and diminishing the liability to ventral hernia at a later date. If on removing the tube a slight purulent discharge is observed, we may keep the track open by inserting a piece of twisted gauze. This allows the tube track to close up gradually, carrying off at the same time any noxious fluids which would otherwise tend to accumulate. After removing the tube the wound is dried, and the provisional sutures drawn up, closing the track of the tube in the abdominal wall.

The provisional sutures are one or two sutures passed through both sides of the abdominal incision in the tube-track, and left loose until the tube is removed, when they are drawn up, completely closing the wound.

It is my opinion that the vast majority of abdominal cases are safer with the tube than without it. The bad results attributed to its use are usually due to carelessness of management. The care of the tube is the duty of the surgeon himself, or of someone equally conscientious and as well instructed.

The culture experiments made with the drainage-tubes were made on thirty cases, in three groups, consisting of ten cases in each group. In the first group the dressings were made with bichloride cotton (1 : 200), dry or moist, and powdered iodoform and boric acid (1 : 7). The bichloride cotton was used for cleansing and covering the tube and incision, and from 3 to 5 grains of the powder were dusted down the tube at each dressing, and enough over the incision to cover it.

Five of the experiments were made by stab cultures in nutrient agar-agar, two tubes being employed for each dressing. In the remaining five cases of this group six Esmarch tubes were used at each dressing. In making the cultures three were taken from the secretion on the end of the plug, and three from the bottom of the drainage-tube. The second and third tubes were dilutions from the original inoculations in the first tube.

The results were negative, save in one case, that of a large ovarian cystoma, which was firmly adherent to the anterior abdominal wall. The inoculations made from the secretions at the bottom of the drainage-tube resulted in an abundant growth of *staphylococcus pyogenes aureus*. Microscopic examination of

the secretions themselves revealed the presence of the ordinary pus cells. The subsequent dressings in this case gave negative results.

In the second group the dressings were made with bichloride cotton (1 : 200), and cheese-cloth sterilized by immersing it in a solution of washing soda, two drachms to the gallon of distilled water, for twenty minutes, then washed in four distinct hot distilled waters, then wrung out, and placed in a 1 : 5000 watery solution of bichloride for one hour, then wrung out of this and kept in alcohol, or a 3 per cent. carbolic solution for preservation. The gauze was cut in strips from 2 to 3 cm. in width, and from 14 to 18 cm. in length. After cleansing the tube as described in the first group, one of these strips was twisted into a plug, after being wrung out in hot distilled water, and was carried to the bottom of the tube. In some few cases dressed in this manner the powder mixture of iodoform and boric acid (1 : 7) was used.

In making the cultures Esmarch tubes were used throughout this series, six for each dressing, three being taken from the secretion on the end of the plug, and three from the secretion in the bottom of the drainage-tube, after removing the plug. Six of this group were controlled by microscopic examinations. The results were all negative.

In the third group the dry bichloride cotton (1 : 200) was used alone, both for cleansing and plugging the tube. None of the experiments in this series were controlled by microscopic examination. The results were also negative.

Although the results of the bacteriological experiments have been practically the same, according as one or the other manner of dressing was adopted, I place the most reliance on the combination of the methods employed with the first and second groups, *i. e.* the use of the bichloride cotton and sterilized gauze with powdered iodoform and boric acid—the cotton for cleansing the tube, the powder to dust down the tube, and the gauze for the drain.

From these results one might reasonably suppose that organisms were not present in the fluid. One point, however, must be borne in mind; that is, the possibility of a certain amount of bichloride of mercury being dissolved out of the plug, and being

present, as such, in the secretions from which the inoculations were made. In this case it is easy to see that the growth of organisms, which might have been present, would be inhibited by the bichloride taken up on the needle used in inoculating the tubes. As has been shown by recent experiments, the amount of bichloride necessary to prevent the growth of organisms which have already been exposed to its action, is very much smaller than the amount necessary to inhibit the growth of the same organisms which have not been so exposed.

Only a small proportion of these culture experiments were controlled by a microscopic examination of the fluid. The results in those cases in which it was resorted to, however, corresponded to those obtained in the culture tubes.

A similar line of experiment, according to the improved methods recently developed for the study of organisms which have been subjected to the action of antiseptics, more particularly the bichloride of mercury, has been begun, and I shall report the result at another time.

Dr. A. Palmer Dudley, of New York.—I wish simply to give my own experience, and, if possible, to answer from that experience two of Dr. Ashby's questions.

In the first place, I will say that my privileges are not equal to those of many of the gentlemen present, therefore, I have not made as many abdominal sections as some of the gentlemen who discuss the paper. I have not had an extensive experience, but in the experience that I have had I have used the drainage-tube but twice, and in both of the cases I lost my patients. In the first case I used the drainage-tube where I removed a large fibroid tumor of the uterus. I removed the tube at the end of twenty-four hours, not having been able to draw more than two drachms of lymph from the tube. My patient died on the eighth day from abscess of the omentum beneath the stomach—a circumscribed abscess without general peritonitis.

In the second case in which I used the drainage-tube I lost the patient from intestinal obstruction, by adhesions of the intestines around the tube on the eighth day. Those are the only two cases in which I have used drainage in seventy-nine laparotomies. Those seventy-nine operations include eight cases

of hysterectomy, one Cæsarean section, two cases of ruptured extra-uterine pregnancy, in one of which there was a pint, and in the other nearly a quart, of blood in the abdominal cavity, the rupture in each one having taken place some two or three weeks before. In five successful cases of pyosalpinx with rupture at the time of operation I used no drainage-tube; therefore, I have made sixty-nine consecutive cases of abdominal section for removal of tubes and ovaries, including those diseases that I have mentioned and three cases of intestinal fistula, without a drainage-tube and without a death.

I do not believe in the drainage-tube except for two purposes: where you are operating for general peritonitis, and where you suspect hemorrhage may follow the operation, or where you are operating on a case in which there has been a recent peritonitis and the peritoneum is congested and bleeds if you irritate it with a sponge. I believe that we can accomplish more by a proper toilette of the peritoneal cavity before closing the abdomen than we can accomplish by the use of any drainage-tube, and I believe that the drainage-tube is only a danger in the hands of many because they believe they can accomplish with it what they ought to accomplish before closing the abdominal cavity.

Now, I want to answer the question, What are the dangers in the use of the drainage-tube? So far as I am concerned, I consider them to be these: Danger of intestinal adhesions by the deposit of lymph around the tube; there is a lymph-canal formed about the tube in a few hours after it is placed in position, and from that you may get intestinal adhesions. Danger from the drainage-tube producing fecal fistula. I have no doubt that some of the cases of fecal fistula which Dr. Ashby has reported were caused by the tube rather than by damage done to the intestines by the Doctor, because I know he is a careful operator. There are some dangers of hernia following the use of the drainage-tube. I have seen it in the practice of my friends, and in one case in which I assisted in operating.

Now he asks, What are the disadvantages of the drainage-tube? They are these: If there is a septic condition existing in the pelvic cavity endangering life, the drainage-tube will not save the patient if the sepsis is sufficiently grave to have spread at all

to the peritoneum. The lymph cavity formed around the tube will soon make a wall around which, outside the drainage-tube, will be collections of pus; I have seen that condition, post-mortem.

The advantages, as I have mentioned, are where we suspect hemorrhage; in that case it is of assistance in making a diagnosis readily. I believe, however, that the entire success of laparotomists is due to great care in the toilette. In a case of pyosalpinx, with a rotten tube and pus escaping, one of the first things I have seen done was to sponge out the pus. That is a very dangerous thing to do, as the rubbing of the pus with a sponge will impregnate the pelvic peritoneum or intestines with poison, whereas, if you allow it simply to flow up and over the wound in a stream of warm water, you will not get peritonitis from it, although you will invariably get inflammation of the wound itself where the pus flows over the wounded cellular tissue. I do not believe in the dangers of pus from a ruptured tube that many believe in, because I think it can be handled in that way. My latest operations have been done with a stream of hot water behind the seat of operation, so that any pus or blood was at once washed out.

Not only do I believe that this is safer than the tube, but I believe that we should make use of the greater drainage-tube—the intestinal tract itself. So it has been my custom and that of some of my friends, to prepare the patient properly with saline cathartics, and then a short time before the operation to give another saline cathartic, so that the vermicular action is going on immediately. In some of the cases of intestinal fistula which I sewed up at the time of operation, the fistula was large enough to pass the finger through. In both cases I gave the patients Seidlitz powders as soon as they came out from the ether, and the temperature never went to 100°. Both convalesced perfectly with less pain and trouble after the operation than they had before, and much less than in cases where, to my knowledge, the drainage-tube has been used. I think one of the complications following laparotomy is that of adhesions produced by the tube in the pelvic cavity, giving after-pains. So I have discarded it, and make a drainage-tube of the intestinal

tract, with the care in closing the peritoneum which I have described.

In place of silk, or silkworm-gut, or other sutures which will have to remain and be buried, I use catgut in my operations, trying always to get the pure catgut, using it in hysterectomy, and having no after-trouble with it.

The point which I wished to call special attention to, is the use of the intestinal tract as a drainage-tube, rather than any glass drainage-tube that can be recommended.

Dr. E. C. Dudley, of Chicago.—There can be no question of the principle which underlies the practice of drainage after laparotomy. Certain material may accumulate in the abdominal cavity, which if left there will destroy the patient, and something should be done to get it out. The vital question is as to the means used for drainage. Inasmuch as a foreign body introduced into the abdominal cavity usually forms a cavity for itself, which corresponds to its own size and shape, therefore a drainage-tube in a few hours may be surrounded by the peritoneal surfaces weakly agglutinated together, and will therefore only drain that cavity which it occupies and not the peritoneum, hence it is frequently inadequate as a means of drainage after the agglutination has formed around it, *i. e.*, after a few hours. Indeed the small cavity which it has formed may not only have no connection with the general peritoneum, but it may also shortly become isolated from the territory which requires drainage—from the field of operation.

All regions in which there are anticipated hemorrhage, oozing of pus, old blood-clots, gangrene, or any condition which may be or may become infectious, should not only be drained but should, if possible, be isolated and shut off from the general peritoneum. This may be accomplished by means of the drainage of Mikulicz, which is simply packing with gauze the entire part to be isolated and drained. Any aseptic gauze may be used; I use iodoform gauze. I described the method of application yesterday in the discussion of Dr. Byford's paper, and will not repeat the description.

There has been some misapprehension as to the length of time this iodoform drainage should be continued; the great mistake has

been in removing it too soon. After twenty-four hours it may become offensive; the temptation is to remove it. If it be removed in twenty-four or even forty-eight hours, the adhesions which have formed around it, and by which you wish to protect the general peritoneal cavity, will break; the sac which has formed around the gauze packing will collapse, the adhesions which have not become strong enough will give way, and the general peritoneum will become infected by the secretion of the cavity you wish to drain, and you have done harm by that drainage rather than good. The gauze should be left intact for one week. In one case of hysterectomy the last of the gauze was not taken out for four or five weeks, and in another, a case of extra-uterine pregnancy, in which the parts were very gangrenous, the last gauze came out in six weeks. I frequently leave it in four weeks, generally two or three. The essential thing is never to use much traction in getting it out. Let it stay as long as it will, and then let it be cast off or removed without undue force. I lost my first case by removing it too soon. It is wonderfully effective in all bad cases requiring drainage.

Dr. Joseph Taber Johnson, of Washington.—Would you use anything after the gauze has been removed?

Dr. Dudley.—I usually put in a small rubber drainage-tube and cut it off as it is pushed up.

Dr. Johnson.—We often see accounts of bad results following these operations and bad-smelling discharges likely to produce septicæmia. The reader of the paper states that he would enlarge the opening a little and wash out the abdominal cavity until all the discharge ceased to smell. Do you do that?

Dr. Dudley.—No, a gauze drain renders this unnecessary by isolation of the general peritoneum, and by removing all fluids from the dangerous territory. It is wholly a question of drainage, and if there is free drainage it matters little how offensive the discharge may be, but we must have free drainage.

Dr. Johnson.—In some cases through the glass drainage-tube we may withdraw in the first three or four days a quart of fluid, blood-clots, and pus—does that all come out through the gauze?

Dr. Dudley.—Yes, it seems almost like a suction-pump, as if the fluid fastened itself on the gauze drainage, and were sucked

up by the absorbent dressing above. Of course we must presuppose that the dressing over this is dry and absorbent, and then the moisture in the drain will follow the law of the direction of least resistance, which is up into the dry absorbent dressing above. Capillary attraction is adequate.

Dr. Matthew D. Mann, of Buffalo.—Would you do away with the glass drainage-tube that we generally use and use this as a substitute for all drainage?

Dr. Dudley.—I would generally use this drainage of gauze whenever, for any reason, it became necessary to isolate the field of the operation from the general peritoneum. It is also an effective means of hæmostasis where large oozing surfaces cannot be secured by ligature. The glass tube may be used in the not very bad drainage cases, and in cases of doubt as to the necessity for drainage.

Dr. H. P. C. Wilson, of Baltimore.—I am very much interested in the statements of Dr. Dudley. I have never been satisfied with the drainage-tube. I now have at home a woman with a rectal fistula which is giving me an immense amount of trouble, due, I am sure, to pressure of the tube against the rectum, and I am perfectly satisfied that wherever there is an extensive surface to be drained you get little or no drainage to that surface by the glass drainage-tube, because, as has been so often stated, the end of the tube is very soon closed by the lymph that collects around it, and the tube might just as well be out of the pelvic cavity as in it. I am satisfied if there is bleeding in any portion of the abdominal or pelvic cavity that is not directly around the tube, the blood will become clotted, and you can no more get it out than if there was no tube there. I was astonished this summer in witnessing some of the very best laparotomists in the world, to see how universally they inserted glass drainage-tubes. In Birmingham I saw a gentleman operate—one of the most skilful whom I ever saw—performing two laparotomies, removal of the ovaries and tubes.

He did it beautifully; I never saw it done better. There was not a drop of blood in the cavity, and I did not see from the manner in which he disposed of the stump how it was possible for any bleeding to occur. He put in a drainage-tube in both

cases. Dr. Bantock was present at the operation. I asked the operator afterward why he used a drainage-tube in this case, that I could not see the slightest necessity for it. He said, "I don't know; I always feel safer when I have a drainage-tube in." I asked him if it was his habit to insert a drainage-tube after all laparotomies, and he said that there were very few in which he did not use one.

I saw Dr. Bantock do a number of laparotomies, and he put a drainage-tube in much more frequently than he left it out. I asked him what his rule was, and he said whenever he had the slightest doubt he used a tube. I saw a great many operations where drainage-tubes were used, where I would not have thought of using one.

I have never been satisfied on the subject of drainage-tubes, and I am very glad that Dr. Dudley has brought this subject before us.

Dr. Mann.—It seems to me that drainage after laparotomy has been very much overdone. Dr. Wilson has told us about Dr. Bantock and others who use the tubes in so many of their cases, and I am sure there are a great many operators in this country who do the same thing. I formerly used the tubes a great deal, but with increasing experience I have come to the conclusion that the drainage-tube is not as necessary as it was formerly thought to be.

I have not made up my records to see, but I do not believe that I have drained in ten per cent. of my cases—I think it would be considerably less than that. When I have inserted a tube, instead of feeling easy as the doctor in Birmingham did, I have always felt uneasy, because I look upon it as capable of doing great harm, and as in need of constant watching. We are likely to have hernia and fistula and abscesses formed from it unless it is cared for with the greatest assiduity, and sometimes even then we get these bad results; so wherever I can I leave out the drainage-tube. It is difficult to lay down any fixed rule; each case must be judged on its merits.

The rule has been given by some one, "When you are in doubt, drain." I would change that, and say, "When you are in doubt, wait." Do not close the abdomen too quickly unless it is

a very severe case and there is great shock. If you are in doubt —and it is generally the milder cases in which we are in doubt, and consequently the shock is not so great—wait, and see if the hemorrhage will not stop; pack with sponges or use hot-water irrigation, and you will often find that the hemorrhage will stop; and in many cases in which drainage seemed almost absolutely necessary at first, you will be able to close the abdomen without the necessity of drainage. I believe ten or fifteen minutes spent in waiting to see if the hemorrhage will not stop will often be a very great gain to the patient in avoiding the dangers I have indicated. I use drainage less and less, and I believe very strongly, as Dr. Dudley, of New York, said yesterday, in drainage by the intestines or the general system. I starve my patients for nearly forty-eight hours, giving them nothing but a little water to wet their lips; they understand that the slim diet is necessary and they bear it. By depriving the system of fluids and making a strong call on the lymphatics to take up fluids, we can cause the absorption of effused serum through the abdomen more safely than by draining it off by a tube. So by following out this idea, which is not new, I think that we can get along very often without any drainage-tube; and if we can, it will be a great deal better for our patient in the end, as well as for ourselves.

Vides ut amplissima eademque propemodum intentata pateat via ad recens natorum morbos attenta dum vivunt observatione, accurata autem post mortem dissectione pervestigandos.

MORGAGNI, *de sedibus et causis morborum.*

CEPHALÆMATOMA VERUM EXTERNUM.

Subpericranial Blood-tumor of the Newborn.

By Howard A. Kelly, M.D.,

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I. Introductory.

II. Description of the Disease.

A. Clinically; *B.* Pathologically; *C.* Diagnostically; *D.* Treatment.

III. History.

a. From the sixth century down to the present, the period of confused observations; *b.* From Michaelis's paper (1799) down to Valleix's (1838), covering the period of general recognition of the disease; the multiplication of clinical observations and active discussion of its pathology, down to the settlement of the most important questions; *c.* From Valleix's writings to the time of Virchow (1863), since which time no important facts have been adduced.

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a. Name; *b.* Sex of child; *c.* Number; *d.* Situation; *e.* Primiparæ; *f.* Pulsation; *g.* Size and shape; *h.* Fluctuation; *i.* Color; *j.* Sensitiveness; *k.* Bony ring; *l.* Date of appearance; *m.* Frequency; *n.* Pathology; *o.* Etiology; *p.* Differential diagnosis; *q.* Treatment.

V. Medico-legal Importance.

VI. Additional Cases.

VII. Conclusions.

VIII. Bibliography.

I. INTRODUCTORY.

It affords me a peculiar pleasure to bring before this Society a full consideration of one of the most important diseases of early childhood, awarding to it more attention than it has yet received at the hands of any writer in the English language. As an American I am not, therefore, open to the imputation of an eminent writer in Austria, as long ago as 1846, when he designated cephalæmatoma as "a disease about which far too much has been written,"[1] while a German writer, in 1854, spoke of "the unseemingly inflated literature upon this subject."[2] Not only has no full account of cephalæmatoma yet appeared in the English language, but I am not aware that any English writer has ever added a single fact in the evolution of our knowledge of this disease.

Any disease may well be considered important as well as interesting when it affects about one in every two hundred and fifty children, occasioning a conspicuous deformity upon the sinciput, possessing marked specific characters, and running a definite course toward recovery; tending, however, in rare instances to undergo serious retrograde changes which may even threaten the life of the child.

Although the prevailing ignorance of the medical profession as to the existence of cephalæmatoma is a sufficient stimulus for a writer, the subject possesses an additional charm for the specialist, lending an impetus to his work in the references which are to be found by careful reading between the lines of almost every prominent gynecological writer, from the earliest down to the present century. In

[1] C. Rokitansky, Man. of Pathol. Anat., translated by C. H. Moore, Phila., Blanchard & Lea, 1855, vol. iii. p. 172.

[2] Dr. V. Bruns, Die Chirur. Krankh. und Verletzungen des Gehirns & Seiner Umhuellungen, Tübingen, 1854.

this way a study of the history of cephalæmatoma affords a conspectus of the natural history of gynecology.[1]

I know of no other disease, with the single exception of extra-uterine pregnancy, which is thus rendered more attractive to the scientific specialist.

II. DESCRIPTION OF THE DISEASE.

A. Clinical History.

Cephalæmatoma is peculiarly a disease of the newborn child. It consists in the formation of a circumscribed effusion of blood between the pericranium (periosteum) and one of the flat bones underlying the hairy scalp.

On the second or third day following birth an elevation or bump is noticed on the side of the head, over one or the other parietal bone, usually near the posterior superior angle of the right. This swelling never crosses a suture, and gives the head a peculiar lopsided appearance, which increases as the tumor, at first covering a small area, gradually extends its limits on all sides, becoming in a few days prominent and tense, elevated from a half an inch to an inch from the skull. The cyst thus formed is fluctuating; the color of the overlying skin, which can be pushed about on the immovable tumor, remains unchanged; pulsation is absent; pressure occasions no pain, and if increased does not diminish the size of the tumor or provoke any signs of compression of the brain.[2]

[1] "Il Importe Beaucoup de Connôitre l'Histoire de la Science à laquelle on s'attache." Boerhaave.

[2] J. B. Paletta, "De Abscessu Capitis Sanguineo Recens Natorum." Exercitationes Pathologicæ. Mediolani, 1820, p. 123, gives this classical description of the disease (the book was published in his seventy-third year):

"Infantes nonnulli recens in lucem editi ab alterutro capitis latere abscessu quodam afficiuntur, scilicet tumore molli cum aliquo fluctuationis sensu, non

A day or two after the tumor is first observed a well-defined bony ring can be felt surrounding its margin, conveying at first touch the impression that the bone is wanting within. If the tumor is not too tense, its bony floor can be felt upon deep pressure. In from ten days to two weeks the lump thus formed begins to diminish in size from absorption of its contents. As it becomes flatter it often has a peculiar parchment feeling, and small bony plates can frequently be felt projecting into its membranous covering.

When all of the fluid has been absorbed the upper layer of the tumor comes in contact with the skull bone, and every trace of the deformity wholly disappears. In some rare instances, the contents of the sac suppurate and produce necrosis of the underlying parietal bone with perforation of the skull, or softening and perforation may take place externally.[1]

The natural tendency of the disease is toward a spontaneous cure.

dolenti, cutis colore non mutato, capiliamento integro, sanguinem fluidum intus continente.

"Tumor hic pleurumque sincipiti dextero incumbit, qui alias ovi maximi, interdum duorum ovorum magnitudine, parum elevatus fere transverse positus, interdum sed rarius secundum sincipitis longitudinem protenditur, adoritur autem infantes, quantum ego observavi, celeri lucina susceptos, tumque a parvulo incrementa capiens abscessus ad treslatos digitos in longitudinem intra hebdomadam excrescit. Illi vero, qui difficili partu excluduntur, perraro hujus generis abscessu tenentur, et tumor, qui inde fit, dum adest paragomphosis, non ejisdem est indoles. . . .

"Compresso circum tumore, digitisque basim ejus contrectando deprehenditur circulus osseus aream tumoris veluti circumvallans, qui ut ora inæquali. et nonnihil extenuata eminet, sic facit ut in ea area quidquam ex ossis substantia deperditum esse existimes."

[1] C. Zeller, "De Cephalæmatomate seu Sanguineo Cranii Tumore Recens Natorum Commentatio Inauguralis," Præs. Franc. Carol. Nægelo, Heidelbergæ, 1822, thus describes the disease, p. 1, "Tumores infantum recens natorum cranio et quidem forsan semper alterutri aut utrique ossi parietali insidentes, indolentes, circumscriptos, cuti concolores, molles, elasticos, magis minusvi tensos, pressione fluctuantes, ex sanguine inter pericranium craniumque ipsum collecto ortos," and pages 2 and 3, "Persæpe in tumoris ambitu margo seu circulus aliquantum prominens tactu dignoscitur, quo facile inducimur, ut intra hunc marginem materiam osseam deesse, vel os foramine pervium esse credamus."

B. Pathology.

The morbid process consists in the separation of the pericranium (periosteum) from the parietal bone by a slow hemorrhage from the periosteal vessels, at first in the form of a thin layer, increasing and becoming more elevated, the contained blood being bright red if observed in the early stages of the disease, and dark but still fluid in its later stages.

Upon dissection the overlying tissues are found unchanged in appearance, or, at the utmost, a few ecchymotic spots with some discoloration are found in the *galea aponeurotica*. The pericranium when thus bared appears dark from the fluid blood beneath it. If examined at an early date it is found actually unchanged, excepting in its topographical and physiological relation to the bone which underlies the affected area. After a few days a delicate villous layer, which sometimes looks shaggy and red like the lining of an old fistulous tract, is deposited from the contained blood over the inner surface of the pericranium and the bone—just as in the case of hæmatomata in other parts of the body.

In spite of its separation and the underlying fluid blood, the pericranium continues actively to generate bone tissue, in the same manner it would have done had it retained its connection with the parietal bone. It soon becomes studded all over on its under surface with little Wormian islets, developing from the periphery, more rapidly above, and growing toward the centre.

Pari passu with this formation of bone is usually noted the absorption of the fluid, so that by the time this periosteal bone-metamorphosis has constructed a complete shell the upper more, and the lower less, convex wall of the cyst fall so exactly together that the defect is filled in, and no deformity whatever is observable. The absorption at times, however,

proceeds so slowly that a thick bony shell coats the still elevated pericranium, resulting in the formation of a hard boss on the head.

Around about the margin of the tumor, at the point where the detached pericranium meets the bone, after the tumor is a few days old, the bony ring already spoken of can be found; this on section is found to be a triangular bony ridge one or two millimetres in height. The pericranium in tightly attached to its sloping upper surface, its under surface rests on the parietal bone. Its inner surface perpendicular to the bone remains free, exposed to the fluid blood forming the cyst. The minute anatomy of this ridge is a delicate fibrillar network enclosing numerous sand-like bony particles. The parietal bone itself is simply stripped of its periosteum, and is in the early stages of the affection in no way diseased. It never becomes carious except as a consequence of suppuration of the cyst.

C. Differential Diagnosis.

Diagnosis properly includes all the differential points separating this from every other form of tumor found upon the infant's head; the diseases, however, which are most liable to be mistaken for cephalæmatoma are *caput succedaneum* and *hernia cerebri*.

Caput Succedaneum.

The point of similarity between caput succedaneum and cephalæmatoma lies in the fact that both are swellings upon the head of the newborn child; but while caput succedaneum always arises during the birth, being born with the child, appearing upon the part of the head presenting during labor in the pelvic excavation, following difficult labors, the reverse is the case in cephalæmatoma, where the tumor usually forms after the birth (frequently an easy labor), its

preferable site being upon that parietal bone which was not most prominent during labor, usually upon the right.

While the tumor of a caput succedaneum has an ill-defined border, crosses sutures, is discolored and doughy, and disappears rapidly after labor, the tumor of a cephalæmatoma increases in size after it is first observed, has sharply-defined borders, and the overlying skin is unchanged in appearance.

Further, the most marked characteristics of the cephalæmatoma—the sharp outline, the bony border, the absence of discoloration of the skin—are never observed in the caput succedaneum. The bony ring is imitated by no other form of tumor of the head. (*One exception noted below.*)

Hernia Cerebri and Cephalæmatoma.

Hernia cerebri appears preferably in the occipital region where cephalæmatoma is but rarely found, and while the cephalæmatoma is lateral and situated upon the bone itself, the hernia appears in the line of the sutures, where cephalæmatoma is never found. Pressure upon the hernia produces uneasiness, twitching, and even convulsions, while the cephalæmatoma can be pressed upon with impunity.

Anastomotic Aneurism forms a tumor of a dark color with an irregular surface, and presents neither the appearance nor the history of the cephalæmatoma.

D. Treatment.

The best plan in most cases is to avoid interference, and preserve an attitude of expectancy. The utmost that is allowable is the use of cooling dilute spirituous or acetous lotions. It is only necessary to recall the anatomical relations of the mass of blood thus placed, to realize how little palliative measures are likely to promote absorption. Smaller tumors thus let alone are absorbed in about three weeks, leaving no

trace behind, and the rule is for larger tumors also to disappear upon patient waiting.

When signs of suppuration set in, as evinced by heat, tenderness, and redness, together with constitutional disturbance, no time should be lost in making a free incision, beginning at the part of the tumor most dependent, as the child lies; the sac should then be washed out and drained. Healing, even after suppuration, may be very rapid.

If the tumor shows no inclination to diminish in size after two or three weeks, it may then be carefully washed, the hair shaved off over a small area rendered aseptic, and opened with a bistoury or punctured with the larger trocar of an aspirating apparatus.

After thus evacuating all the fluid, a compress of dry absorbent lint is applied and kept in place by a cap, thus keeping the pericranium in close contact with the bone.

The writers early in this century and even in the last, almost without exception, advocated a free incision of the tumor, and they speak with surprising frequency of a union by first intention. Union by first intention ought therefore at least to be the rule to-day in all non-suppurative cases in which it is necessary to interfere surgically.

III. HISTORY.

The history of cephalæmatoma is deeply interesting, beginning at a remote period, when the first reference to it is found in the sixth century, in the writings of Aëtius, of Amida, in Mesopotamia, a graduate of the medical school of Alexandria, who practised in Byzantium. He speaks in his sixth book "Of a collection of fluid in the skin without the pericranial membrane, or between the pericranium and the bone; a tumor forms at that part of the head where the collection has taken place, which is of uniform color, painless and soft,

yielding and changing on pressure with the fingers. If the tumor arise spontaneously it is unchanged in color and painless, but if it arise from a blow or bruise it is red from the start and painful. Later, however, it changes in form to a thin nature, it is of uniform color with the skin and painless."[1]

It is clear from this quotation that Aëtius is speaking of fluid tumors of the scalp, and distinguishes between bumps and bruises, and such spontaneous tumors as cephalæmatomata. The want of the perfect clearness in the description is due in the first place to the fact that the differential signs of cephalæmatomata were not well known until the present century, and in the second place to the want of specific accuracy of description which, as a rule, characterized all the ancient writing throughout.

A long interval of more than a thousand years separates Aëtius from the next writer.[2] In 1682 Cornelis Stalpart van der Wiel, of Haag, Holland, published a book of remarkable observations in which he clearly refers to cephalæmatoma. We must, before reading his note, recall the fact that in his day "hydrocephalus" was a generic term applied to all fluid accumulations about the head, within and without.

He says "that hydrocephalus of this sort arises from violence and other external cause, and it contains, too, a

[1] Aëtius Amidenus, Librorum Medicinalium Lib. vi. init. T. I. fol. 99, vers. ed. Venet. 1534.

"*ἀγροῦ μὲν οὖν ὑγροῦ συλλεγομένου κατὰ το δέρμα, ἐξωθεν τοῦ περικρανίου ὑμένος· ἢ μεταξὺ τοῦ περικρανίου καὶ τοῦ ὀστέου· ὄγκος συνεδρεύει κατά τι μέρος τῆς κεφαλῆς· καθ' ὃν η γεγονὶα συλλογή· ὁμόχρους ἀναλγής: εὐαφής· εἴκοντος καὶ μεθισταμένου κατὰ τὴν τῶν δακτύλων ἐπαφήν· καὶ εἴ μὲν ἀυτόματος γένηται ἐξαρχῆς, ἀνώδυνος καὶ ὁμόχρους ἔσται ὁ τόπος· εἰ δὲ ἐκ πληγῆς ἢ θλάσματος, κατ' ἀρχὰς μὲν ἐνερεθὴς καὶ ἐπώδυνος γίνεται ὁ ὄγκος· ὕστερον δὲ ἀργευομένου τοῦ ὑγροῦ καὶ μεταβαλλομένου εἰς λεπτὴν οὐσίαν, τότε ὁ ὄγκος ὁμόχρους καὶ ἀνώδυνος.*"

[2] Haller (Dorpat, 1824) says of Aëtius in this connection: Ex loco quodam scriptorum (Aëtii) suspicari licet, et hujus animo observatam fuisse hujus morbi memoriam, tametsi manca enumeret istius phenomena, ab alius capitis tumoribus non satis distincta."

muddy, bloody, or grumous fluid, while that in the internal hydrocephalus is clear and limpid."[1]

In 1682, the same year in which Stalpart van der Wiel wrote, the great obstetrician Mauriceau[2] published the first edition of his work, and in the twenty-fourth chapter of the third book, on the injuries of the head and other parts of the body of the newborn child (Des contusions et meurtrissures de la teste et des autres parties du corps de l'enfant nouveau-né) he remarks, immediately after an excellent account of caput succedaneum, "Sometimes the swelling does not go down immediately, because the extravasated blood by its long delay in one part has lost its life and become deprived of its gases, and is unable to move. In this condition, either resolution must take place, or, if there is much delay, suppuration will occur. Hot fomentations with wine are the best means of securing resolution. If, in spite of the treatment, suppuration comes on, one will not delay too long, on account of the danger of caries of the delicate cranial bones, but will open with a lancet, *sec. art.*"

A phenomenally clear description appears in the following year, 1683, by M. B. Valentinus, of Giessen, in the *Ephemerides*,[3] where he describes the case of an infant seven days old which had a tumor on the left parietal bone, which had been observed from its birth. The tumor was as large as a goose-egg, painless and fluctuating, and when opened a large amount of blood escaped. The child was thus cured. (v. Zeller, p. 50.)

In the year 1712, Max Preuss wrote an account of swellings on the head of newborn children, also in the *Ephem-*

[1] "Quod tales hydrocephali non tantum a violentia, aliave causa externa, nascantur, sed et quod in iisdem limosa quædam, vel sanguinolenta, turbulentaque, semper reperiatur lympha, cum tamen in internis hydrocephalis ea clara semper et limpida apparcat." (Van Sweiten Comment., iv. page 119.)

[2] Traité des Maladies des femmes grosses et de celles qui sont nouvellement accouchées, Paris, 1682, p. 393.

[3] Ephem. Nat. Cur., Dec. II, An. ii. Obs. 162.

erides,[1] where he attributes tumors of the head of newborn children to violence done the scalp in difficult labors, or traction efforts of the midwife dragging the scalp loose from the cranium, by means of which the blood is prevented from returning, ruptures its vessels and forms little varicose soft sacs full of blood, sometimes containing corruption and ichorous matter.

The activity of the scientific medical men of the eighteenth century was very great, and they have left us numerous other important references of which the next appears in 1722, in the work of Th. Zwinger,[2] of Basel, where he thus records a case, stating that twenty years ago he was called to see a little boy, recently born, who had a soft, indolent serous tumor, of uniform color with the skin, on the top of his head, of the size of a goose-egg. The child was perfectly healthy. Consultation was held and determined that the tumor was full of fluid between the membranes of the brain and the cranium. They deliberated carefully whether to open and let out the serum. They determined to wait a little, and purged the child and used fomentations. One surgeon wished to open the tumor, letting out the fluid, but another recalled several cases of death from this procedure; later two surgeons wished to puncture the tumor, thus getting rid of the danger of gangrene and slough, but the physicians with another surgeon opposed themselves to this plan. The tumor was then treated with a decoction of herbs

[1] D. Max Preuss, Infantum recens natorum tumores in capite lati et elati, sanguineo-varicosa, et ichorosi interdum, Vratislavia, 1712. Acad. Cæs.-Leop. Carolinæ naturæ curiosorum Ephemerides, Cent. III. Obs. xx. p. 42.

[2] Pædojatreja practica, Basileæ, p. 29, "Tumor mollis vertieis capitis infantibus recens natis." "Viginti plus minus anni præterlabuntur, quibus, vocatus ad filiolum recens natum capitanei cujusdam Basiliensis, consilium inire rogabar cum chirurgo alias satis experto, ad tumorem mollem, indolentem plane serosum, cuti concolorem, quem iste in bregmate habuit magnitudine ovum anserinum plane æquantem, alias vegetus, vivax atque labe ulteriore omni immunis." "Tandem vero in hoc convenerunt, tumori huic neque emplastrum, neque cataplasma, neque corrosivum qualecunque esse applicandum, sed herbas, etc." "Tumor sensim immunitus et tandem plane dissipatus fuit."

in wine, and finally disappeared as the writer naïvely observes: "Atque ita puellus feliciter à tumore liberatus in hunc usque diem anni 1720, sanus et incolumis vivit." Later, at the end of the chapter, Zwinger cites a case in which a surgeon opened a tumor and the child died in thirty hours in convulsions, and another case in which a barber treated a tumor with a plaster and the tumor suppurated and the child died.

Not ten years more passed by before a curious, careful study of the disease appeared in 1731, at Paris, at the hands of F. Le Dran,[1] who saw in these tumors of the head a specific disease, and, going further than his predecessors, discovered the little bony ring surrounding the tumor; but his additional observation misled him in his inference as to its nature, as he at once took the tumors to be cases of hernia cerebri, an error into which he led many of his followers.

With some circumstantiality he writes: "In the beginning of September, 1728, Mademoiselle Neveu, living in the Princess Street, sent me her child which she had borne two days previously. At the time of its birth they had discovered a swelling occupying almost the entire right parietal bone, soft and indolent, an inch in height and fluctuating. I hesitated, at first, to express an opinion, as I felt at its circumference a bony ridge which gave me the impression that the ossification of the cranium was wanting in that place, and so I questioned whether the tumor was not a hernia of the brain, or if it was an aneurism formed by the rupture of a little artery. Convinced that the tumor in question was a hernia of the brain, I put on thick compresses soaked with brandy.

"At the end of a month the tumor had entirely disappeared." He frankly says at the close,[2] "Although I have considered and treated this disease as a hernia of the brain, I leave it to the reader to decide as to its nature."

[1] Obs. de Chirurgie, T. i. Obs. 1, Paris, 1731.

[2] Quoique j'aye regardé et traité cette maladie comme une Hernie du Cerveau, je laisse au lecteur a decider de sa nature."

Still more distinct becomes the clinical picture which we find in the *Commerc. Lit. Phys. Tech. Med. Norimbergæ*, for 1734, p. 31, in a reference to a case in which there were two tumors. "Later two globular eminences or tumors arose; the left the size of the fist and the right the size of a hen's egg, both soft to the touch."[1]

In 1738 appeared a carefully-written article by D. D. Trew, in which he accurately describes the disease, but with undue deference to an opinion, adopted Le Dran's idea that it was a hernia cerebri. Trew[2] remarked the characteristic lateral site of the tumors, and the fact that they appear at birth or soon after, and that the sensation conveyed upon palpation is, that there is a hole in the parietal bone. Both tumors disappeared under emollient applications; and, as he puts it, the bones gradually drew together.

In 1749 Corvinus[3] wrote an essay on hernia of the brain, in which he clearly referred to this affection. He says: "On the right parietal bone, beneath the pericranium, was a bloody tumor containing abundant extravasated blood, filling the pericranium, detached and protruding from the parietal."[4]

Inasmuch as there has been a tendency on the part of writers since 1800 to neglect the work of the last century, and date the discovery of the disease from a paper written by Dr. Michaelis, of Harburg, in *Löder's Journal*, in 1799, it becomes deeply interesting to note as we advance the frequent unmistakable references made by our predecessors of more than a hundred years, whose acute observation was often drawn to a complaint occurring with such frequency and presenting such a startling appearance. Their struggles to estab-

[1] "Posterius duo globi, seu tumores, exstabant; sinister pugni magnitudinem, dexter ovum gallinaceum æquans, amboque molles ad tactum erant."

[2] Commerc. Lit. Phys. Tech. Med. Noric., 1738, p. 412, Ex Communicatione, D. D. Trew.

[3] De Hernia Cerebri, Argent, 1749.

[4] Ad os parietale dextrum sub pericranio obtulit sese tumor sanguinolentus satis copioso sanguine extravasato, pericranium a dicto osse penitus separamente atque protrudente repletus." He cites a case where hernia cerebri was complicated by cephalæmatoma,

lish the etiology, diagnosis, and pathology are particularly interesting to one reading between the lines.

Storch[1] in 1750, in the opening paragraph of the chapter on blemishes which children bring with them into the world, says that suggillation (caput succedaneum) arises when the child lingers long in the birth. He then blames the midwives for examining too much and too hard during the birth, for this sometimes produces swellings like hen's eggs full of blood.

His practical familiarity with the disease is evident when he says further on, that if the blood does not disperse, but remains as a soft node and a tumor, one should not await suppuration but must open the node with a lancet, letting out the black blood, and dressing the wound with a camphorated emplastrum. One must be especially careful in treating those swellings which occur over sutures and fontanelles, as they may communicate with the brain and cause death if opened. He further cites the case of a high-born child in 1732, in which the tumor was situated laterally on the parietal bone, which he opened and thus cured.

If he had a fairly-clear conception of the clinical features of the disease, his knowledge of the pathology was erroneous, showing the danger of theorizing, for in his chapter on "hydrocephalus externus," which it will be remembered was in his day a general term for all fluid accumulations without the cranium, he commends Bonetus for rejecting this as a disease, "because one well knows from dissections how closely the pericranium adheres to the cranium—indeed it can only be removed by scraping. If fluid were to effect this, it would occasion great pain, which is never observed in hydrocephalus externus; it would also rather rupture the pericranium than separate it from the pericranium. This refutation of the ancients is therefore quite reasonable."[2]

[1] Johann Storchen's Theor. and Prak. Abhand. von Kinderkrankheiten. Eisenach, p. 111, and p. 119, 1750.

[2] Das Pericranium würde, wenn es von innerlich quellenden wasser abgetrieben würde, eher zerreissen, als sich vom Cranio abheben. Welche Widerlegung der Alter denn auch gar vernünftig ist" T. I. p. 394.

While these earlier notices of cephalæmatoma, among the French and German writers, have been more or less fragmentary and indistinct, the first notice which I have been able to find in the English language is a quaint, singularly clear, life-like description, by an author known only by the initials R. B.

His contribution appears in the well-known family magazine of the last century—*The Gentleman's Magazine and Historical Chronicle*, published in London in 1754, by Sylvanus Urban, to which R. B. writes—"Some time since I was desired to visit a child a fortnight old, that had a swelling as large as a small hen's egg, on the superior part of the right parietal bone, without any discoloration of the teguments. The tumor felt soft, but had not a very perceptible fluctuation. It was observed by the women soon after birth, and when it had once excited their notice, its increase was easily discovered." He took it for an ecchymosis and was considering whether "an incision might not prove the most judicious as well as expeditious attempt to cure. Under such considerations I made a more careful re-examination of the tumor, when I very distinctly felt the bone terminating in an edge quite around its basis. As this circumstance had escaped my first notice, it gave rise to other reflections, which very soon outweighed my former opinion, and induced me to believe that nature was deficient in her ossifications, and the tumor formed by the brain, forced out of place by the almost constant crying and struggling of the child, and the want of due resistance in that part of the cranium. When I had carefully reflected on the last-mentioned circumstances, I thought myself very happy in the discovery, because, had I pursued my first-formed opinion of the cure, I tremble to think of the consequences—by a moderately-tight bandage, and embrocations with aromatic brandy only, the tumor became gradually less, so that within a fortnight there was not the least remains to be discovered."

It is interesting, now a hundred and thirty-six years later,

in the light of better knowledge, to follow the writer's train of thought, and observe how his first conclusion, that he had to deal with a blood tumor, was correct, and under this correct assumption he was about to pursue an incorrect plan of treatment, that of opening the tumor; but when he discovered the little bony ring surrounding the tumor, almost a pathognomonic sign of cephalæmatoma, misled by the impression conveyed, he jumped to the conclusion that the case was a hernia cerebri, under which erroneous assumption he then pursued a correct plan of treatment—palliative applications. He was thankful for escaping from an error into which he had never fallen, while he was actually delivered from a mistake he had no idea he was committing.

Henkel (*Siebente Samml. seiner Med. und Chirurg. Anmerk.*, Berl. 1760, p. 49) describes a case of tumor of the right parietal bone, and contends that Le Dran's case was not a hernia cerebri, but a form of external hydrocephalus, or spurious aneurism, or an ecchymosis.

Van Swieten[1] in 1765, in his commentary on Boerhaave's *Aphorisms*, gives a clear definition of the significance in his day of the term hydrocephalus:

"Hence hydrocephalus, a collection between the external teguments themselves, between these and the cranium, between the cranium and the cerebral membranes; among the membranes themselves, their duplicatures, between these and the brain; among the folds of the brain in the cerebral cavities." He quotes Aëtius and Stalpart van der Wiel, but gives us an account of cephalæmatoma ("Nonnunquam tamenetiam fœculentam et Sanguineam") which is much confused with caput succedaneum.

Levret[2] does not confuse other tumors of the head with hernia cerebri, for he writes, paragraph 1248: "I have observed that occipital tumors are of bad augury, and most of

[1] Gerard L. B. van Swieten, Commentaria in Hermanni Boerhaave Aphorismos, T. iv. Sec. 1217, p. 118.

[2] L'Art der Accouchemens, Third edition, Paris, 1766, p. 258.

the children die soon of convulsions, which rarely happens in the case of tumors of other parts of the head." He continues, § 1249, "There is a kind of tumor which instead of diminishing, increases in volume, and tends to suppuration; if the skin has retained its natural condition, it is fluid blood which escapes."

Levret's treatment was to make a crucial incision, emptying all blood and reuniting the edges of the incision by suture.

In 1787, Baudelocque[1] wrote: "it is a rare thing to see a child after a long, tedious labor which has not a tumor on its head. At other times it is a tumor filled with blood, which cannot be opened too soon, as it is located on the cranial bones, which could become diseased by too long contact with the blood."

Osiander wrote of the disease in 1787, but I will defer a consideration of his work, as I wish later to refer to a discussion relative to priority, into which he entered in 1821.

In the year 1792, Dr. Detharding, of Rostock, wrote thus to the editor of *Starck's Archiv:*[2] "About four weeks ago I delivered a woman of her child by forceps. The child had a rupture of the brain; on the middle of one of the parietal bones is a tumor of the size of a hen's egg. It is soft, but has not the sensation of fluctuation. It is covered by the natural healthy skin and round about the border of the tumor, one can distinctly feel the margin of the defect in the bone. Upon pressing somewhat harder on it, the child at first draws itself back in anxiety, and by continuing the pressure, begins to cry. I have now a hollow leaden plate on it with compresses moistened with strong brandy, but thus far see little improvement. I am thinking of lessening the size of the concavity of the plate, little by little, in order to close in the tumor gradually, and see if I cannot, in that way, get a good result. Your opinion would be welcome to me."

[1] J. L. Baudelocque, Principes sur l'art des Accouchemens par demandes et réponses, p. 543. Paris, 1787.

[2] Starck's Archiv, Jena, 1792, p. 765.

With the close of the last century, in the year 1799, appeared in *Löder's Journal*[1] an essay by Dr. Michaelis, of Harburg, "On a Peculiar Form of Blood-tumor." This paper has, with some propriety, been referred to ever since as laying the foundation of our knowledge of this subject. We shall shortly see that Michaelis had a pretty clear knowledge of the clinical features of the disease, although in gross error as to its etiology and pathology. We shall also consider the grave charge of dishonesty laid by Prof. Osiander at Michaelis's door, and thus modify our opinion more or less as to the character of Michaelis's work, whether original or compilatory.

We will, I think, after the above quotations from the older writers, not feel inclined to discredit those earnest laborers whose work lay in the gray dawn of scientific medicine, when views of the specific differences between diseases were still clouded in the mists of the mysterious. They showed us, their followers, the legitimate road to success by accumulated, patient observation, the way we have walked ever since. In thus paying tribute to their work, we can say, with enthusiasm, "they have labored, we have entered into their labors."

Michaelis says: "I wish to speak principally of a very peculiar sort of blood-tumor on the head of the newborn child, which is always connected with the corruption of the bone, and sometimes at a later date, through defect of the bone, occasions death. This tumor must, under no circumstances, be confused with that which comes from a slow, protracted birth, and the consequent rupture of the bloodvessels, although children are sometimes born with it, or acquire it a few hours after birth. That it is no ordinary tumor of the head, or protrusion of the brain, or hydrocephalus, the following symptoms clearly show:

"*First.* We find it often after an easy birth.

"*Second.* It does not always appear on those parts of the

[1] Löder's Journal, Jena, 1799, vol. ii. pt. iv. p. 657.

head which presented in labor, although this may be the case, as it is usually found on the parietal bones:

"*Third.* It arises sometimes—and this is probably the usual way—the day following the birth, while on the other hand, the caput succedaneum is born with the child.

"*Fourth.* This tumor is more elevated and circumscribed than the caput succedaneum, and yields a distinct fluctuation.

"*Fifth.* The scalp overlying the tumor is unchanged in color, and can easily be pushed about without moving the tumor, an evidence of its deep situation.

"*Sixth.* The tumor neither disappears on pressure nor is it made smaller. Pressure also has no effect in making the child soporific, as in the case of hydrocephalus and brain-tumor.

"*Seventh.* It is distinguished from a tumor arising from a chance bloodvessel or from a lymphatic tumor, by the change in the bone, which is distinctly to be felt. The outer table of the bone is wanting in all of these tumors at this place, exposing the diploë; from the beginning one can feel the sharp border of the bone around the depression. This symptom distinguishes this tumor from every other kind, and is quite peculiar to it. Upon opening the tumor thick, black blood is found lying directly on the rough bone, which is not only robbed of its periosteum but of the outer smooth table as well. If one seeks to dissipate the tumor it is usually waste time and trouble, for the deficit in the bone visibly increases owing to the pressure and irritation of the blood, which excite the absorbent vessels to greater activity, by which means a perforation of the bone can arise."

After speaking of his experience in Italy with Paletta, and with Dr. Scheidebauer, in Vienna, through whom he gained a familiarity with the disease, he says: "Since then I have not seen such a case in a newborn child until now. In this child, which had passed through an easy birth, showing no caput succedaneum on the second day, a considerable tumor, as large as half a pigeon's egg, was visible at the lower ante-

rior angle of the right parietal bone, but far enough removed from the border of the bone to recognize distinctly bony substance between the tumor and the suture. I recognized the nature of the tumor at once, particularly by means of the characteristic bony border. The color of the skin was unaltered.

"I did not conceal the danger from the parents, and promised to open the tumor if attempts to disperse did not succeed. It was treated for fourteen days in vain with poultices, sal-ammoniac, saltpeter and vinegar, and with a warm brew of mountain arnica blossoms cooked in vinegar. I did not like to delay longer, especially as the parents were so anxious to get rid of the disagreeable lump. I therefore opened the tumor on the 23d of February, with a bistoury by a medium-sized incision. Thick, black blood ran out. The bleeding was very moderate, although the child was quite pale. I used, with the best result in checking the bleeding, charpey dipped in alcohol. I found the bones as usual—rough and bared, and the outer table wanting. The margin round the circumference of the tumor could be distinctly felt." After a period of free suppuration, he states that: "On the 6th of March I found all healed up, and could only recognize the depression in the bone by its sharp border through the skin." After speaking of vascular tumors of this part, Michaelis states in a postscript that "The above-mentioned child died on the 24th of March, 1799, of a general erysipelas extending from the legs over the whole body." He says: "I did not lose the opportunity to examine the condition of the bone in the position of the tumor. As I incised the covering of the bone I discovered it was robbed of its outer plate and was rough and red, but united with the pericranium. This was the condition of the bone as far as the tumor had extended, with the exception that in a few places the outer table had begun to regenerate. Around the margin was a border, a line in elevation, round and smooth. I regret that I could not keep this piece of bone so that, by transmitting the same to the editor

of this journal, I might by actual inspection convince many of this peculiar sort of bony defect."

The views of Michaelis bore fruit at once. The disease was henceforth readily recognized and no longer mistaken for hernia cerebri, but his false views as to the pathology were also adopted by many, while they very soon provoked on the part of acute observers a vigorous opposition.

Thus Jahn[1] refers to an observation by Naegele, stating that "Herr Michaelis makes the observation that bloody tumors of this kind are always associated with destruction of the bone, and in this way are almost always fatal."

And Hencke,[2] in 1809, is also dominated by this idea when he writes, in his work on diseases of children, "The cure is often tedious and the malady for the most part fatal."

Burchard, in 1837, wrote: "It cannot be altogether denied that G. P. Michaelis was the first writer who referred this cranial disease to the affections of the newborn."

In 1812 Naegele[3] wrote, in a somewhat elaborate foot-note, "This disease seems to be but little known,[4] and as far as I remember, the first publication came from Dr. Michaelis."

Then follows a careful abstract from Michaelis's work, after which he adds, for his own part, "That the statement of Michaelis that the external surface of the bone is always rough and robbed of its outer smooth table, as well as his opinion that the bloody tumor is a consequence of the defect in the bone, cannot be supported by my experience. Never upon opening these tumors have I found the bone rough, injured, or corroded, but always smooth. That Michaelis has always found the contrary, I can well understand, when he waited as long in all his cases as in the last, where he delayed operation for fourteen days. I am rather of the opinion that

[1] Jahn, Neues Syst. der Kinderkrankheiten, Rudolstadt, 1807.

[2] Handb. zur Erkennt, und Heilung der Kinderkrankheiten, Frankf. a. M., p. 119, 1809.

[3] Erfahrungen Mannheim, p. 245, 1812.

[4] "Diese Krankheit scheint noch wieng bekannt zu seyn."

the injury of the bone arises from the prolonged detention of the blood between the pericranium and the skull, whereby its nourishment and growth in this place are interfered with. I do not, however, deny that this is possible, that the bone is diseased and rough in case the tumor should have existed some time before birth, but this must be extremely rare, for in none of the cases observed by me or detailed to me by others, which I have been able to collect with care for ten years, was this so. A year ago, I received from a young physician a description of a case apparently of this sort. He was called to a child five weeks old, which had brought into the world with it two such bloody tumors, one on the middle of each parietal bone. The surgeon who had opened the tumors, the third day after the birth, stated that he had found the bones carious. This statement, however, is not very reliable, for he had found himself, on account of this opening, in an embarrassed position. The child was in a very weakened condition through loss of matter and blood. This condition increased up to the sixteenth week, when the plate of bone was thrown off. Diarrhœa set in and the child died. About the middle of the left parietal bone there was found a hole about an inch and a half in circumference. On account of the extreme serious consequences, due to delay in emptying out these tumors, this evil deserves the greatest attention on the part of the physician."

Naegele further says he has seen these tumors from the size of a bean to a hen's egg on all parts of the bony scalp. When several existed they were connected by a small bridge or often separate. They always occur from two to three days after birth, and in a few cases where the tumor was observed small and flat immediately after birth, it slowly enlarged up to a certain size and then ceased to grow.

The tumors contain black and usually *coagulated blood*, and after opening filled again, necessitating a reopening. After a few days the tumor is surrounded by a bony ring. The

cases are *observed after easy births, never after difficult or forceps labors.*

Paletta, in 1810,[1] and again in 1820,[2] wrote a description of this disease which is of classical beauty for clearness and succinctness. He held the views as to the cause of the affection which were promulgated by Michaelis, who refers to Paletta as his instructor.

It is impossible to pass over this most important epoch in the history of cephalæmatoma without noticing more in detail statements made by Prof. Osiander in 1821.

A long series of years separate us from the workers of the last century, and it is sometimes a difficult as well as an unpleasant task to rake up the dead ashes of old strifes and jealousies, and attempt to sit in judgment upon our predecessors. In the present instance we have from Osiander a clear and succinct, and, perhaps, justly bitter statement, that Michaelis was dishonest in failing to give credit for valuable information given him at his clinic.

Osiander's words are these: "One must not confuse these tumors with the imaginary one described by the deceased Dr. G. E. Michaelis, which he pictured as very dangerous, and yet stated that he has cured them, tumors which he in reality confused with those described by me. As he returned from his travels he visited me on his way home, just as I was about to open one of these blood tumors in a newborn child. He saw the operation and was very much astonished that I so boldly opened it down to the bone, and he prophesied serious consequences, assuring me that he had had experiences of this kind in Italy, and the children always died when such a tumor was opened, because the outer bony layer was wanting down to the diploë, and that in Italy they dispersed them with warm fomentations. I was, therefore, much surprised as I read soon after an article in *Löder's Journal:* "Ueber eine eigene Art von Blutgeschwulsten, etc."

[1] De abscessu capitis sanguineo, Mediolani, 1810.

[2] Exercitationes pathologicæ, Mediolani, 1820.

We must render tribute to whom it is due, although it is almost a century since, and if we recognize in Michaelis's writing the first clear clinical picture of cephalæmatoma we should give even more credit to men like Osiander and Paletta, who preceded and taught him; we will also recognize in his writing, as we cast a glance over the host of essays which appeared within the next thirty years, but the voice of one who chanced to speak first of a host ready to cry out. The great error committed by Michaelis in his positive statement that the outer table of the parietal bone is wanting and the bone is carious, remained a source of great confusion and argument for a generation afterward, and led to an active operative interference in cases of cephalæmatoma, which would have been otherwise undisturbed.

In the year 1822, there was published at Heidelberg an excellent dissertation by C. Zeller,[1] a pupil of Naegele's, in which he vigorously opposed Michaelis's statement as to the decay of the bone,[2] tracing the error to its proper source, the Italians.[3]

The important part of Zeller's description has been quoted in the original in the clinical description of the disease. His paper includes a critical study of the disease in all its aspects, and concludes by citing some twenty cases. The first was on the right parietal bone of a male infant, noticed the first day after the confinement, increased very markedly until it occupied almost the whole surface of the bone, extending 3 x 2½ inches, and being an inch in height. It was opened on the seventh day and the child cured. His second case is a double cephalæmatoma, one on each parietal bone, of the size of half a hen's egg. This was opened and cured in the same way.

1 De cephalæmatomate, seu sanguineo cranii tumore recens natorum, p. 65. C. Zeller, Heidelberg, 1822.

2 "Contra nonnullorum opinionem, non corrosum nec corruptum nec læsum, sed læve et integrum esse, tumor apertus persuadet."

3 "Quo ex libro apparet, Michaelem sententiam suam huic Italorum medicorum debere."

H. Becker wrote for *Hufeland's Journal*, in 1823, an excellent account of cephalæmatoma. His interest was first aroused by the fact that one of his children had the disease. He was much worried by the positive statements of Michaelis that the bone was diseased, and rendered anxious by Naegele's statement that it was necessary to open it, and by Goelis's recommendation to use caustic. In his doubt he applied to an experienced Dr. Günther, of Duïsburg. Dr. Günther told him that he had seen many such cases and to let it alone. In this case the tumor appeared on the third day on the right parietal bone near the great fontanelle, and gradually extended back to the lambdoidal suture until it was two and a half inches long, one and a half inch broad in the middle, and almost an inch high. It formed a circumscribed, slightly tense, painless, and elastic tumor, a little warmer to the touch than the rest of the head. Around this was felt the bony ring. The bone within this seemed to be absent, as the writer at first believed to be actually the case. Deeper pressure revealed the bony floor. The color of the skin was natural; there was fluctuation and no pulsation. The child was healthy. The treatment consisted at first in lotions of brandy and water and fomentations, with elder flowers and chamomile, and later a vinous infusion of aromatic spices. In sixteen days the tumor began to diminish in size, and in twenty-two days it was gone. Three years later an unevenness of the bone could still be distinguished, as it was elevated at its anterior end about a line, and posteriorly about two and a half lines.

In three cases observed the births were slow, but not instrumental. In 1826, Hoere wrote a very valuable paper on external and internal cephalæmatoma, with two diagrams.

The following is taken from Dr. Kraus in Busch's *Journal of Obstetrics* (Zwei Falle von Kopfblutgeschwulst Neugeborner mit der Sectionsgeschichte des einen Falls, *Gemeinsame Deutsch. Zeitschr. f. Geburtsk.*, Bd. vi. p. 379):

"The first case was a woman of thirty-one, who had borne eleven children. In her twelfth pregnancy the head of the child came rapidly into the pelvis, and before the midwife could get the patient to the bed the child was shot out by a strong pain, falling on the floor in the middle of the room. The umbilical cord broke in two parts. A quarter of an hour afterward a second boy was born in the bed. Both children were small. On the head of the one born on the floor no injury whatever could be detected by careful examination. First, on the eighth day after the birth did the mother notice, on the child born on the floor, a tumor on each side of the sagittal suture. The tumor on the left parietal bone was the size of a silver dollar; that on the right was smaller and more elongate. They were treated with aromatic fomentations. Five days after the discovery of the tumor that on the left side began to diminish. In three weeks there was no tumor noticeable on the left parietal bone. The bony ring which had been felt around about the margin of the tumor had almost disappeared. The ring and the tumor had also disappeared on the right side. At the anterior end of the tumor, near the coronal suture, was a remarkable depression about the size of a groschen, encircled with a somewhat sharp, bony border. Upon pressing on it with the finger a resisting floor could not be detected. There was no pulsation. When the child was nine weeks old this place was also completely ossified, slightly depressed, and not as flat as the other bones.

The writer remarks "that the bony formation was absent in one part of the parietal bone, can be the subject of no doubt.

"The second case, a woman of thirty-three years, unmarried, bore a girl baby after twenty-four hours' hard labor. The midwife, while washing the child, at once noticed a tumor differing from those she was accustomed to seeing. Dr. Kraus, in examining it, found close to an ordinary caput succedaneum an elevated tense tumor, occupying nearly the whole of the right parietal bone. The surface of the

scalp was unchanged in color or temperature. The tumor fluctuated, and was enclosed in a bony ring, which, however, could not be distinctly felt on the upper margin of the tumor on account of the caput succedaneum. As the child could not get proper care under palliative treatment, Dr. Kraus opened the tumor on the third day by an incision a half-inch in length. Half a coffee-cup full of bright red blood streamed out and kept discharging until he was obliged to use cold water to check the hemorrhage. A small, soft, yielding spot with a thin, sharp border was felt in the middle of the tumor, and gentle pressure at this point caused uneasiness and crying. At this time a soft place was found on the left parietal bone, also surrounded with a bony ring and fluctuating. Nothing was done to this. The child died when four weeks old. A post-mortem examination was made. In opening the tumor on the left side it was found to contain a layer of broth-like fluid not thicker than the back of a knife, lying upon the roughened bone. At one point on the upper border appeared a delicate layer of bone. On the right side at the fluctuating point near the sagittal suture, there was found a small quantity of thin pus. The surface of the bone was rough and deepened, and at the depression a place about as big as a pea, where the covering of the brain was exposed. The dura mater throughout the whole skull was perfectly sound."

In discussing this paper d'Outrepont (page 390) described nine cases, three of which occurred in a lying-in house, and were recognized immediately after birth. The other six were seen in private practice, two of them on children born with forceps, in which the tumor was also recognized immediately after birth. In two more the midwife discovered the tumor when she was bathing the child. In the remaining two the author was first called three days after birth. The midwife declared she had seen the tumor in one case immediately after birth. The second one declared that the tumor appeared on the third day. Both were easy, rapid births.

D'Outrepont further says, with the exception of the first

case, the children had brought the disease into the world with them. He considered the disease as a result of a defect in the bone and not produced mechanically. ("Daher glaube ich dass das Uebel waehrend der Schwangerschaft entstent und nicht waehrend der Geburt.")

D'Outrepont's method of treating them was, to make an incision as long as the tumor, let the blood thoroughly empty itself, unite the lips of the wound with adhesive plaster, and cover it with charpie. The "wound healed by first intention," and the children remained well, and the skin adhered to the bone, so that on the fourth day after the operation it was no more movable. The operations were undertaken from ten to sixteen hours after birth.

In the *North American Archives of Medical and Surgical Science*, Baltimore, 1835, page 217, Dr. Geddings, Professor of Anatomy and Physiology in the University of Maryland, gives this clinical description of the disease, stating that such tumors are seldom observed except in newborn infants, yet they are now and then met with in children of a more advanced age, and in rare instances, even in adults. He also makes the remark which has not lost its force fifty-five years later, that it is remarkable that this disease should have received so small a share of attention on the part of practitioners. "With only a few exceptions it has been entirely overlooked or very imperfectly described by English, French, and American authors; and although the German physicians have investigated it with more attention, its characters still remain involved in much obscurity."

Geddings then quotes several authorities. "Chelius," says he, "speaks of a tumor occurring in the temporal region, and Velpeau observed a case spreading over the left parietal, temporal, occipital, and right parietal regions."

"Pigné has erroneously represented that they are never found in the course of the sutures. This is contradicted by one of our own cases, in which the tumor formed over the sagittal suture, and by one of Naegele's, in which it extended from one parietal bone to the other."

"Dieffenbach thought that the tumor was between the pericranium and the integuments of the scalp."

Geddings divides the treatment into two groups. First, dispersion of the tumor by promoting the absorption of its contents. Second, the evacuation of the blood by puncture or incision. He further states that the first method should be fully tried previously to resorting to the second. Even tumors of very large size may be sometimes dispersed. Of Byerle's seven cases six were cured in a few days by aromatic vinous fomentations. and it was necessary to open the tumor in but one.

In 1838, Valleix published, in Paris, in his *Clinique des Maladies des Enfants Nouveau-nés*, one of the most thorough, carefully critical papers on cephalæmatoma which has ever appeared. Valleix based his conclusions on a number of minute observations on the cadaver, as well as upon his careful research into the literature and clinical observations.

His descriptions throughout are excellent. I will here quote but a few points in which he differs from his predecessors, citing in some detail his views as to the pathology of the disease. "In spite of the assertions of several writers there exists no well-authenticated case in which cephalæmatoma has been recognized before labor. In the one case in which I have seen the disease at its start, the integument was deep red and slightly œdematous. The bony ring does not exist at the outset. In one case it did not exist and the child died before it was formed. In another case it went on developing while under observation."

In speaking of the causes Valleix says it is a mistake to say that it occurs after easy labors, it is rather the precipitate labors we should speak of.

In his studies as to the causation of cephalæmatoma Valleix observed first that in natural labors, where there was no suspicion of injury, there was almost always an ecchymosis between the bones and their external membrane, occupying the summit of the head, from three to three

and a half inches in length, by two to two and a half inches in breadth, along the upper border of the parietal bones, and that this was considerably more extensive on the right parietal than the left; that it was wanting in one case of a twin, in which it was, however, impossible to determine whether it had been born first or last. In order to gain more exact information further examinations were made on twenty-eight subjects, between the ages of from five to forty days, confirming the statement just made. An excellent colored plate shows the ecchymotic appearance of this area, dark and infiltrated with blood, easily seen by its deepened color, through its transparent pericranium. The cellular tissue just beneath the pericranium appeared sometimes to be simply of a uniform red color, without any other change. It was oftener, however, increased in thickness and tore with ease, adhering to the bone and the pericranium in the form of little rounded red granules packed together, looking like a layer of jelly. This ecchymosis exists much longer than the caput succedaneum, which disappears at the latest at the end of two or three days, while the former has been found as late as the twenty-fifth day after birth. When there existed a layer of blood Valleix always found at the end of a certain time little bony plates, which it was very easy to detach by slipping the scalpel under them, leaving the bone with its natural radiate appearance. Valleix next asked what is the cause of this ecchymosis. Its position on the summit of the head and its ovoid form do not allow us to adopt the explanation that it is produced by pressure on a resistant plane such as the sides of the pelvis, for it is only the anterior, posterior, and lateral portions of the skull which are thus pressed upon. Every consideration tends to the idea that the ecchymosis is the result of a circular pressure, whose acting power is placed at the centre of the parts traversed by the head, which cannot be other than the cervix uteri. This explains at once how that the cervix having been well dilated by the first birth the second does not present such an ecchymosis in twin births.

The reason why the ecchymosis is more extensive on the right parietal bone is, on account of the greater frequency of the head-presentation. Valleix, after these considerations, comes to the conclusion that this ecchymosis is but the first step toward a cephalæmatoma. These are the salient points. The parts most exposed to the simple ecchymosis are also the seat of the bloody tumor. The blood, infiltrated or poured out, as the case may be, can only come from the same source. The same cause acting in different degrees can produce, first, a simple red discoloration; second, a marked infiltration; and third, a destruction of tissue with the pouring out of a layer of blood. The connection between these three steps is a distinct one. In three cases examined post-mortem, the ovoid discoloration was evident on one side, due to an infiltration of blood, on the other, was a well-defined cephalæmatoma. The cephalæmatoma is, therefore, but the fourth degree of this scale.

Doepp (in *Walther and Ammon's Journal*, vol. 32, Berlin, 1843, pages 99–108) observed, in an extensive private practice in the course of twenty-six years, but 3 cases of cephalæmatoma. On the contrary, in St. Petersburg Foundling Asylum, in a period of eleven years, he had occasion to treat 262 cases. Of these, 1 was on the squamous portion of the left temporal bone, 2 on the occipital bone; all the others on the parietal bones and almost always near the upper border. Out of 100, 64 were observed on the right side, 31 on the left side, 5 double, that is, on both sides at the same time, 1 was triple, that is, on both parietals and on the occipital bone. The average was 1 case of cephalæmatoma in 190 children. This average was taken from 50,000 children in the institution. Post-mortem examination was made upon 11 children, 3 of whom died of the disease, with the following results:

(*a*) In none of these cases was there any trace of ecchymosis on the inner surface of the skull, nor was there any perforation of the skull.

(*b*) All the children had the disease when they were

brought into the institution. The tumor, however, often grew while under observation; never, however, after the first three days, excepting those cases which were opened.

(*c*) In but nine instances had Doepp the opportunity to inquire into the character of the labor. They were in all cases easy and head-first. The mothers were strong, three of them were primiparæ.

(*d*) The integument covering the tumor was always of a natural color, and could be pushed about over the growth. Pulsation was never noticed. The tumor was always painless, even upon rough handling. The form was generally oval, the largest having the appearance of two or three joined together. The largest of all was four inches in length and three in breadth. The smallest was the size of a hazelnut.

(*e*) The hard border always existed, although not equally distinct in all places.

Doepp believes that Naegele's cases, where he did not find the hard border, were simply ecchymoses under the aponeurosis. When the tumor is opened and the blood pressed out, this border begins on the next day to disappear, and after four or five days no trace of it is left behind. Doepp thinks this peculiarity of the tumor contradicts all previous explanations as to its origin. In two post-mortems, he discovered that the hard border was composed of coagulated, hardened blood. The periosteum was everywhere normal and smooth. There were no dilated or ruptured bloodvessels. The bone was also perfectly smooth. Seven of the skulls which were kept, belonged to children in which the tumor had been opened at a later date, and where there had been a previous suppuration. In these the outer layer of the bone with the diploë was absorbed, and the hard border indicated actual destruction of the bone. These cases account for the statements of Michaelis and Paletta. Of his two hundred and sixty-five children, only three died in consequence of the

extension of the inflammation to the brain covering, and these from cauterization of the tumor with nitrate of silver (Goelis's method); the seven other children who died were carried off by intercurrent diseases. The false membrane described by Valleix was never seen by Doepp.

The treatment was by means of fomentations, and if at the end of the second week there seemed to be no tendency to absorption, the tumor was opened with an "oncotom," making an opening four to five lines in length.

In a few places the child fainted from the hemorrhage, necessitating the use of a hæmostatic solution in the sac.

Rokitansky wrote, in 1846, "cephalæmatoma is a disease of frequent occurrence on the skull of a newborn child, a disease on which far too much has been written. By the quantity of blood extravasated and the consequent swelling, it is to be distinguished from an extravasation in the form of a thin layer with an indistinctly defined margin, on the parietal bones, which is extremely frequent in newborn children. This last extravasation is, indeed, of considerable importance, inasmuch as it is only a lesser degree of that hemorrhage which constitutes the thrombus. Cephalæmatoma on the parietal bone generally resembles a kidney in shape, its greater margin lying along the sagittal border of the bone, its concave edge embracing the parietal prominence. Neither on the parietal nor on any other bone does it probably ever commence on the *punctum ossificationis*. Not unfrequently, however, it spreads over the *punctum* as well as the rest of the bone. Cephalæmatoma is constantly circumscribed near the margin of the affected bone, and does not pass beyond the suture. It is a circumstance of considerable importance, for it has hitherto been almost unnoticed, that in very many cases, in which there is a collection of blood on the outer surface of the skull, there is also a corresponding extravasation between its inner surface and the dura mater. The inner accumulation is, as a rule, less extensive, but there are cases in which the reverse is the fact. Of course, if the bone be laid bare

in this manner on both sides for a long time, the prognosis is unfavorable. Cephalæmatoma, originally, is nothing more than an accumulation of blood beneath the pericranium; there is no essential anomaly there, in that membrane or on the bone; most of the blood is usually coagulated and is of a blackish-red color; and a pale red fibrinous coagulum stained with the coloring matter of the blood frequently adheres to the inner surface of the pericranium and to the bone. An inflammatory process commences at the margin of the denuded part of the bone, and bony matter is deposited in the form of a velvety and finely filamentous osteophyte. Upon the exposed bone and inner surface of the pericranium a fluid next exudes, which is at first gelatinous, but gradually becomes more dense; and it may be observed that the bony margin becomes continuous with the layer of exudation that adheres to the pericranium, while at the base of the tumor it meets that which covers the bone. Should this extravasated blood be removed by absorption or evacuated by an artificial opening in the tumor, the pericranium and bone unite together in a simple manner by means of the exudation.

But if this do not occur a very remarkable appearance is presented in a very few cases—few, inasmuch as the inflammation usually becomes suppurative—the layers of exudation covering the bone and pericranium generally ossify. The ossification of both layers of the exudation is sometimes limited to particular spots, and sometimes partial ossification is met with only on that layer which lines the pericranium. This state of parts may lead to the error that the outer table is separated from the bone and adheres to the pericranium.

Far more frequently, when the swelling is not opened and its contents evacuated, the inflammation becomes suppurative, and ulceration or caries and partial necrosis ensue. Cephalæmatoma thus proves fatal, either by exhaustion, or by the extension of the inflammation to the brain. The fatal

result is occasionally brought about by purulent matter being taken into the circulation, and by consequent pyæmic metastasis.

"In recent cephalæmatoma a manifest congestion of the bones of the skull is pretty constantly observed. There is no question that the final rupture of the vessels is due to this congestion; and it is most certain, from the fact that in ordinary cases there is no other abnormal appearance to which the hemorrhage could be attributed. Moreover, the bone beneath the extravasated blood appears pale, and this results from the emptiness of its vessels.

It is an interesting circumstance that cephalæmatoma sometimes coexists with effusion of blood between other tissues holding the same relation to each other as bone and periosteum. Thus peripheral apoplexy of a congested liver, or extravasation of blood beneath its peritoneal investment, is not an unfrequent accompaniment of cephalæmatoma."

From this full description, from Rokitansky, it will be seen that while he adopted much from his predecessors, more especially the work of Valleix, he still transmitted a number of the errors which it has remained for later writers to correct. His statement that few cases recovered, if let alone, without suppuration, was one particularly calculated to do harm, leading as it does to invariable operative interference. His statement that the bone and pericranium are covered with gelatinous exudation which ossifies, enclosing the tumor in a bony shell, is an error corrected by Virchow, next quoted.

Virchow, in 1863, has given an admirable picture of the disease, accompanied by three plates exhibiting the disease in section, showing the bony ring and showing the shell of ossification encasing the blood. Virchow says that the cephalæmatoma arises from the separation of the pericranium from the bones of the skull, by the escape of blood from vessels which pass in great number to the young bones, and which are thus torn in the act of birth, and the blood pours

itself out into the cavity thus formed. The separation comes from pressure of the maternal parts upon the child's head. At the margin of the tumor there is a hard eminence at the point of attachment of the pericranium to the skull. This border becomes thicker and thicker. By long continuance of the tumor this bony substance pushes further and further forward, gradually forming a shell over the blood tumor. While this process is going on, the tumor, as a rule, diminishes in size, and ossification, in the form of scales or leaf-like plates on the inner surface of the pericranium, continues to grow, until it forms an almost continuous layer of scales. This shell is made up then simply of little Wormian bones. This appearance has caused much astonishment until recent times, when development of bone is better understood. It is well known that it is the pericranium, from which new layers of bone are formed, deposited with the growth of the skull on the old bones. My researches have developed the fact that it is not an exudate or an amorphous blastema, but a proliferation of the layers of the periosteum from which the new layers of bone are projected. If now the pericranium is separated from the bones by means of blood, it none the less continues to form new layers of bony substance; only these cannot be deposited directly upon the old bones because the blood lies between. Only at the margin where the membrane is attached are the new layers deposited directly upon the old, and thus arises the ring. By the continuation of the ossification, the bony shell is formed. The peculiarity of cephalæmatoma is that the blood in these tumors remains fluid for an unusually long time, and at the most, the walls show a little fibrinous deposit. I have repeatedly had the opportunity of examining this blood after it had been from four to six weeks in the tumors, and it was fluid every time and had well-preserved blood-corpuscles. This is indeed fortunate, as by this means the later adaptation of the outer bony layer to the old bone is rendered possible. The artificial removal of the blood is usually not

necessary, and oftener harmful, as the bleeding is easily renewed. Patience usually brings about the desired result, and even if somewhat slower, the fitting of the periosteal bony layers is more complete in the hæmatoma which is not opened than in that which has been opened.

Runge says, writing in 1885, that cephalæmatoma never crosses the sutures or fontanelles; and that the tumors are not at all or but slightly sensitive. The bony ring is formed after a few days. The general condition of the child is in no way disturbed. Any disturbance positively indicates some complication. The tumor is discovered on the second or third day after birth, grows and reaches its greatest extent from the sixth to the eighth day, and begins in the second week to diminish in size, completely disappearing in from ten to fifteen weeks. There frequently remains a hard, uneven eminence on the site of the tumor several months afterward. This course of the disease is the rule and only special circumstances lead to any other termination. Cephalæmatoma is a pretty rare disease. If with cephalæmatoma, the child exhibits brain symptoms, there is a suspicion that the external tumor is complicated by an effusion between the dura mater and the bones, or an effusion of blood into the brain. In these cases the children die almost without exception, and we nearly always have to do with a trauma during the birth. Suppuration is another dangerous complication. This happens, as a rule, only from a wound or ill-directed surgical efforts. In explaining the pathology of cephalæmatoma, Runge adopts the explanation of Valleix, followed by Rokitansky, in stating that it is but an advanced degree of the light effusion commonly found after every birth. The only difficulty is in explaining those cases in which it has been found after a breech labor, in cases in which the child has passed spontaneously. In several cases in the literature, operative measures in the pelvic presentation are expressly noted.

As for treatment, Runge expressly warns against any operative efforts in uncomplicated cases. Surgical treatment

can only be excused in an uncomplicated cephalæmatoma when the tumor is unusually large and after it has existed for several weeks showing no tendency to resorption.

IV. ANALYSIS.

I have thus devoted considerable space to a consideration of the natural history, as well as the history of the development of our knowledge of cephalæmatoma, adducing at length abundant evidence that the writers of the last century at least clearly recognized the existence of a peculiar disease, having specific characters, affecting the newborn infant, although for the most part in gross error in their pathological inferences.

I also exhibited under a series of quotations, as well as by the bibliography which follows, the interest aroused by this disease in the early part of the present century, when discussions as to its pathology were rife, discussions gradually evolving the clearer views which we possess to-day, a heritage of the labors of Naegele, Hoere, Valleix, Doepp, Bruns, Virchow, and others.

It now remains briefly to consider the subject from an analytical standpoint.

a. Name.

The name of a disease if deliberately selected, is either an attempt to describe it by some characteristic feature, or it expresses the view of its pathology held at the time the name was given.

The name cephalæmatoma [*c* pronounced as *s*] simply characterizes a prominent feature of the disease, and is noncommittal as to pathology. It means literally "blood tumor of the head;" it was invented and applied by Naegele, first appearing in print in the preface of his pupil Zeller's dissertation, who says: "Si morbus, in quantum adhuc nobis est,

peculiaris, peculiari nomine recte insignitur, me, quod reprehendi possit, fecisse non puto, usurpans id nomen, quo Naegele salvo meliore in lectionibus usus est."

Before this time, under the domination of a variety of theories, the disease had been variously called by Preuss in 1712 "*Sanguineo-varicose tumor*," and in 1731 by Le Dran "*Spurious Aneurism*," and "*Hernia Cerebri*." Plenk called it "*Ecchymoma capitis recens natorum cariosum*." Feiler used the term "*Ecchymoma capitis*." Osiander "*Ecchymosis*." The term "*Thrombus Neonatorum*" is found in Goelis, while Froriep simply says "*Blutbeule*."

"Scheitelbeingeschwulst" is another German title, and "Hæmatosteon," and Ὀστεωματωμα have been applied by Callisen and Rautenberg.

Burchard reminds us of a curious bit of history, long since forgotten, when he tells us that Osiander, senior, mistook the true nature of the disease, taking the tumors for *extraordinary fontanelles*—"*Ausserordentliche Fontanellen der Scheitelknochen*," which were thereafter briefly called "*Osiander's Fontanelles*."

Paletta expressed his views of the disease when he called it "*Abscessus capitis sanguineus recens natorum*."

"Craniohæmatoncus" and "Craniæmatoncus" are awkward compounds from Κρανιον, αἱμα, ὀγκος, —skull, blood, tumor, and are rightly obsolete terms.

Hoere wishing to be more exact than cephalæmatoma called it "*Craniœmatoma*," inasmuch as it does not appear indifferently on all parts of the head, but only on the cranial vault.

Busch calls it "Pericraniæmatoma," and Bruns also with greater exactitude, bearing in mind the cases of internal hemorrhage from which he wishes to distinguish it, applies the name "Epicraniæmatoma." or "Epicranial hæmatoma."

Valleix noted many cases of hemorrhage superficial to the pericranium or subaponeurotic, and distinguished this form by the name "Cephalæmatome sous pericranien."

We thus see in this brief review, that the name has been

used to teach both pathology and clinical characters, and musters before us as well a long-forgotten history, telling of the struggles of our predecessors in their attempts at analysis and classification of the affection.

b. Sex.

There is a marked predisposition to the formation of cephalæmatoma on the part of the male sex. Thus Burchard has noted a proportion of 377 males affected to 100 females, and Seux, while estimating the difference as far less, still notes the marked disproportion of 142 males to 100 females. This is not, as we shall see, without its etiological significance.

c. Site. d. Number.

Naegele has spoken of a number of tumors on one child' head, and Zeller, in his second observation, cites a case of double cephalæmatoma, one on each parietal bone, the size of a hen's egg cut in half.

Depaul (*Journal des Sages-Femmes*, August, 1877), in a clinical lecture, stated that he had seen as many as three tumors on one child.

Ruge (*Berliner klin. Wochenschrift*, No. 5, 1876) mentioned a case of a woman dying inter-partum, in whom a fully-developed child was found in breech presentation, with a cephalæmatoma on each side.

Garceau (*Boston Med. and Surg. Journ.*, July, 1872, p. 47) reports a case of cephalæmatoma over each parietal bone.

Valleix emphasizes the facts that it is oftenest found on the posterior-superior angle of the right parietal bone. In five cases he found two on the right, two on the left parietal, and one on each parietal.

Valleix further says that when the cephalæmatoma crosses a suture it is not *subpericranial* but *subaponeurotic*.

Dr. V. Bruns (1854), in one hundred cases of cephalæ-

matoma, found the tumor over sixty times on the right, over thirty times on the left parietal, two to three on the occipital bone, and one to two times on the frontal and temporal bones.

Doepp, in two hundred and sixty-two cephalæmatomas, found one case on the left temporal bone, and two on the occipital.

Mildner noted out of ninety-six cases four on both parietals; two cases were occipital, one frontal and one temporal.

Depaul remarks that cephalæmatoma rarely crosses a suture or intrenches on a parietal boss.

Dr. Firor (*Amer. Pract.*, vol. i., 1880, p. 214) cited a case in his practice in which the tumor was formed upon the occipital bone.

e. The mother.

The majority of all cases occur in primiparæ. Burchard notes twenty-nine primiparæ as against eight pluriparæ.

f. Pulsation.

There is a curious want of accord on this head. Pulsation is undoubtedly a rare sign in cephalæmatoma, and its absence has been taken as a most important diagnostic difference between this disease and hernia cerebri; but there are not wanting writers who declare they have observed its presence here also, while others deny its existence in uncomplicated cases, asserting that when present it must indicate fracture of the bone, and probable communication with an intracranial meningeal cephalæmatoma.

Burchard noted pulsation in two tumors, and confirmed his observation by many witnesses. Internal cephalæmatoma was found on death.

Hoere says as the tumor swells and becomes more tense, a pulsation felt at first disappears, and when the elasticity goes down it becomes more doughy.

Naegele also noted the presence of pulsation.

By common consent it is one of the rarest signs, and its presence must, in the present state of our knowledge, render the prognosis grave, putting the doctor on his guard against intracranial complications.

g. Size.

The cephalæmatoma is usually small at the start, seated above the boss of the right parietal bone. It grows visibly for several days, extending in area as well as becoming more prominent. It may thus finally cover the whole parietal bone, boss included. The loss of blood thus taken out of the circulation by this internal hemorrhage is evidently considerable and sometimes serious in its consequences.

Paletta (1820) had an idea that the tumor grew until it was opened. This, however, is never borne out by the fact, as the growth commonly ceases in from four days to a week.

h. Fluctuation.

This sign varies with the stage of the growth; it is, as Valleix says, usually very distinct, but sometimes obscure. The extreme tenseness of the tumor, or a little œdema of the overlying skin, as well as the unusual complication of coagulated instead of fluid contents, may all interfere with the fluctuation.

Hoere (1826) says if one opens the tumor in the period of increase the blood is bright red; later, as the elasticity begins to diminish and a doughy feeling is present, one finds black blood, often coagulated.

Dr. Tanner (*Diseases of Infancy and Childhood*, edited by Meadows, London, 1870, p. 377) is clearly wrong when he states that "it generally pits on pressure."

After the little bony plates form on the under side of the periosteum, and the blood has been almost completely absorbed,

a peculiar, parchment-crackling sensation is conveyed on palpation and the fluid is felt to shoot from under the finger.

Gayeon thus describes the process of ossification in the pericranium: "Dix jours plus tard je sentis de petites pointes osseuses qui toutes portaient de la circonférence, et convergeaient vers un centre commun, passant sous la peau et audessus de la tumeur, dont la saillie était à peine sensible. Bientôt les pointes osseuses s'étaient multipliées à l'infini, et plusieurs d'entre elles se touchaient par leurs extrémités."

i. Color.

Levret (1772) said the color of the skin covering the tumor was unchanged, and although this is unquestionably the rule, and, therefore, one of the most important diagnostic marks, it is not without its notable exceptions.

Naegele saw cases in which the skin was altered in color, and Valleix, a most conscientious, careful observer, saw a case where, before the tumor had swelled and become tense, the skin was lightly œdematous and of a deep red color.

j. Sensitiveness.

The tumor has also in a few rare instances been found sensitive to pressure.

k. The Bony Ring.

The small, elevated ring of bone which everywhere limits the cephalæmatoma at its outer margin is one of the most characteristic features of the disease, one which has given rise to most active discussions and often erroneous views. The first impression conveyed on feeling this ring, that it forms the limit of a perforation in the bone, is the view most widely adopted in the last century. The correction of this gross error did not at once give place to a right view

as to its nature, for Paletta and Michaelis imagined that, if there was no actual perforation, at least the outer table of the bone was wanting, and the disease was a caries of the bone. This notion also involves the idea that the ring exists from the very first appearance of the tumor. This Michaelis actually states.

When it was found that the bone was not carious, writers differed still more widely in their ideas of the nature of the ring. An important point in the investigation was then manifestly to decide just when the ring first made its appearance.

Zeller says: "We do not believe that the prominent margin is first felt after the tumor has for some time been in existence."[1]

Fortin observed a case in which no bony ring could be found at first; in two days, however, it was very evident.

Valleix says: "In two cases I have not found the ring. In the one the disease was at its very commencement. In the other it had not acquired its development. The first case died before it could be formed." In a post-mortem (p. 521) Valleix found that this ring was an elevated line in close union with the pericranium, and made up of little osseous granulations. He concluded that the ring was, therefore, of the same nature as the osteophytes of Lobstein, seen on periosteum elevated by purulent foci, in newborn children.

Virchow set the question at rest by referring it to the physiological property of the periosteum, first demonstrated by him, of forming bone by a proliferation of its inner layers.

When, therefore, the periosteum is separated from the bone by a layer of blood, it none the less continues to make bone. At the margin where it is attached, the new layers of bone and the old are in direct contact, and thus arises the ring, while a continuation of the ossification forms the bony shell of the tumor.

[1] "Non quidem in ea sumus opinione, illum marginem imprimis tum sentire posse, cum tumor diutius duraverit."

l. Time of Appearance.

The time at which the tumor makes its appearance is a matter of much interest, and has provoked not a little discussion. It is evidently of value in establishing the etiology of the disease—whether due to disease of the bone, a tendency to hemorrhage, or some other diathetic condition, or to a trauma during birth, such as pressure by the maternal parts, forceps injuries, or even injuries after birth. Observations have differed widely on this head, and some curious phenomena have been observed which we are hardly able to explain, such as the existence of a cephalæmatoma upon the immature fœtus, as well as the presence of such a tumor upon children several years old or even on adults.

Timmermann says that cephalæmatoma is either noticed at once after birth, or after a few days, and it then, according to Valleix, takes but little time to develop fully—from a few hours to one or two days; the latter cites a case where the swelling at the first observation was very small, within a few hours it had manifestly enlarged, and on the following day it was one and a half inches in diameter, and a day later occupied the whole of the parietal bone.

Osiander first noted that they were sometimes discovered before birth.

Dr. Cleveland (1881) reported a case in which he found the woman in labor and the os dilated to the size of a silver dollar, and through it projected a firm tumor. The child was stillborn, weighing about twelve pounds. The tumor was a cephalæmatoma.

Burchard, in an analysis of 53 cases, says that cephalæmatoma was found in 2 before labor was over; in 24 cases a little after the labor; in 15 cases on the third day; in 1 case each on the fourth, fifth, sixth, seventh, tenth, and eleventh days. No statement is made as to the others.

Bouchut cites a case observed before birth, which had no bony ring at first.

Fortin also observed a case before birth, the size of a pigeon's egg, also without a bony ring, which developed in two days.

Valleix, who has made the most careful exhaustive analysis of the whole subject up to his day (1838), states, in spite of these and other recorded cases, that there is no well-authenticated instance of cephalæmatoma observed before birth.

Osserburg found a cephalæmatoma on the right parietal of a five and a half months' fœtus (*Schmidt's Jahrb.*, xx.).

Albert also found cephalæmatoma several times in abortion cases (*Schmidt's Jahrb.*, 1846, xxii.).

Schmidt found two children affected *in utero*.

Semmelweiss saw one in a case of Cæsarean section (Hofmokl, *Arch. f. Kinderheilkunde*, i. H. 9).

Hueter found one on a footling which died immediately after birth.

In 1840 Trefurt quoted Pigné, who states that the tumor arises during pregnancy, and in his own observations discovered a tumor upon the head of a child still in the middle of the pelvis. It was about the size of a hen's egg, soft, fluctuating, and bag-like. He applied the forceps and delivered an asphyxiated child. The lax tumor gradually became more tense as the child recovered, and in the course of several hours it felt like an ordinary cephalæmatoma with the exception of the bony ring. The tumor was opened, and dark blood escaped.

We have thus been accustomed to consider cephalæmatoma as peculiarly a disease of the earliest post-natal period, either linking itself directly, or by a brief interval, with the birth. Well-authenticated instances are, however, recorded in which older children were affected. First of all is that of J. L. Vogel (*Chirurgische Wahrnehmungen Luebeck*, 1780, Part II., p. 45) "Von einer Starken Ergiessung des Bluts unter der Beinhaut des Hirnschaedels," who relates a case where a big boy climbed up on a bench and grasped a nine-year-old boy by the hair and, for a joke, tried to lift him up. He succeeded

in holding the boy for a few seconds, and then tried it again. The little fellow hid his pain for fear of his companions, and nothing was known until a tumor was discovered on his head eight days later. It was a cold, soft tumor, three inches high, occupying the whole left side of the head. Vogel opened it with a lancet in two places over the parietal bone, emptying it of two coffee-cupfuls of thin fluid. He thought at first it was under the *galea aponeurotica*, and that the periosteum was uninjured, but the sound showed that it was between the periosteum and the bone. On the following day he noticed a tumor on the left side of the forehead, which increased and was opened, and on the fourth day a tumor on the right side of the forehead. He says that in spite of the fact that the bone was exposed and the wound secreted pus for ten days, the periosteum grew over the bone and the wound soon healed.

Hoere observed a case appearing four weeks after birth. Dr. Mallock, of Hamilton, Canada, showed the writer a patient who had developed the disease at one year of age.

Hennig reported a case two years old.

Dr. Bierbaum reported a case in the *Journ. f. Kinderk.*, vol. xxxv., 1860, in which a cephalæmatoma affected the eight and a half year old son of a midwife, a somewhat underdeveloped boy, who had for eight days had a tumor, the size of a hen's egg, at the anterior lower part of the parietal bone, circumscribed, painless, immobile, elastic, and fluctuating. The skin retained its natural color. Around its margin was the prominent bony ridge. No explanation of the origin of the tumor could be given. The tumor grew, extending horizontally backward. On incising it, a quantity of black-fluid blood ran out, when the bony borders could be more distinctly felt. The child recovered perfectly, no trace of the tumor being left behind. *Schmidt's Jahrb.* (vol. cc. p. 151) abstracts the following from Prof. Gosselin's paper (*Arch. Gén.*, Nov. 1882). A patient, a youth, seventeen years of age, had a soft tumor the size of a walnut, on the right parietal

bone; it fluctuated and was surrounded by a raised border. It was painless. Prof. Gosselin treated this by compression for two months, and the swelling diminished, when it was found that there was perforation of the parietal bone. The blood did not reaccumulate and the perforated place became filled with a dense tissue. Another case was reported in a boy eight years old. Prof. Gosselin thought these cases were due to a rarefying osteitis. He refers to a case by Dupont in 1858, where there was a hæmatoma which communicated with a sinus dura mater. He also referred to a case of Larrey's in 1866, of a man thirty-six years of age, with a symmetrical perforation of both parietal bones, a consequence of a rarefying osteitis.

m. Frequency.

It is a point of interest to every practical accoucheur to know with what average frequency he is apt to meet with this disease. Observation will show that he will be prone to consider the affection common or rare according as a larger or smaller number of obstetric cases are passing under his eye.

We will hardly under any circumstances agree with Clement Godson (1884), who says: "This disease is of very rare occurrence."

Hoere thought it occurred as often as 1 in 100 labors.

Burchard in 1837 also was not far from this estimate, for he saw on an average, 1 case in 108 labors.

Trefurt states, in 1840, that he had seen 11 cases in ten years in private practice, and 12 or 14 more in surgical clinics. He quotes the Berlin Institute under Busch's direction as recording 7 cases out of 2077 births, and Valleix as noting 4 cases in 1937 children. Bruns in 1854 quotes Doepp, who found 262 cases in 50,000 births in 11 years at the St. Petersburg Asylum, that is 1 in 190.

Mildner in Prag found 96 cases in 21,045 foundlings or 1

in 219. Seux in 1863, estimates by combining his own and Valleix's and Burchard's cases, that the proportion is 1 case of cephalæmatoma to 150 children.

Hennig in 1877 says out of a total of 53,506 newborn children 230 cases of cephalæmatoma occurred, or 0.43 per cent.

Hennig further says: "To a thousand sick children I reckon one blood-tumor."

Runge in 1887 quotes Hofmokl (1880), who found in the reports of the Vienese Foundling Asylum 371 cephalæmatoma in 59,885 cases, or 0.6 per cent.

Such are a few of the most important statistical estimates which have been made, and I do not think that any combination of the above statistics will give a result for practical purposes more exact than these varying figures. It is evident that the classes of cases considered, as well as local influences, have much to do with a frequency varying from 1 in 100 to 1 in 200 or more births.

n. Pathology.

It would take a long article to describe all the changing and peculiar views as to pathology which have been largely dwelt upon in the history of this affection. As Bruns says: "These bloody tumors are the most speaking examples of the manner in which the greatest errors and contradictions have found their way into science from inexact observations, not associated with a sufficient knowledge or anatomico-pathological observations."

Paletta represented the views of most writers of his time (early in this century) when he wrote: "Evidens est ex iis, quæ in cranio perspeximus, in hujusmodi malo exterioris tabulæ cranii partem aliquam deficere; item sanguinem, qui ex vasis deploes effunditur, sese colligere inter pericranium et tabulam interiorem [nam exterioris portio desideratur] abscessumque, de quo diximus, gignere. Hujusmodi naturæ,

nisi plurimum fallor, videtur fuisse capitis tumor, quem dranius describit, atque herniam fuisse cerebri probare nititur."

Many observers soon showed that destruction of the bone if it occurred at all, was rare, and that the rule was that the bone was sound and unchanged, and the essence of the disease lay in a simple separation of the pericranium from the cranial bone by an effusion of blood from ruptured vessels. Valleix laid stress on a thin gelatinous friable layer, which he found lining many tumors.

o. Etiology.

The cause of cephalæmatoma is still a mooted subject. The most natural supposition is that it arises from trauma during the act of birth, but the cases manifestly subjected to the most trauma are plainly, from the experience of everyone, not the ones most prone to the affection. The next most natural supposition is that there must be a predisposition, with the common trauma even of an easy birth, as the efficient cause. Another observer looks upon a disposition to hemorrhage as the acting cause. While there is probably truth in each of these views, they are still but general statements, barren until supported by carefully-noted facts.

The idea of a trauma would seem to be borne out by such a case as this. Nélaton says a Malayal boy was struck on the head with a stick, and a tumor formed as big as a chicken's egg. On opening it he found blood partly coagulated between the periosteum and the cranium. A child five years of age fell on its head raising a tumor as big as an egg on the right parietal beneath the pericranium.

Naegele stated that cephalæmatoma arose after easy labors, and never after difficult or forceps labors: while the first assertion is not true, the last is false.

Burchard found 37 cases where the labor was described as Eutokia, and 8 following Dystokia.

Miller (*System of Surgery*, vol. i. p. 592, Edinburgh, 1864),

incorrectly says, cephalæmatomata "form especially if the labors have been tedious, or the pains very violent."

Osiander (1787) says it occurs as well after natural as after aided labor, and thought it arose from rupture of an artery, a *vasculum emissarium;* arising from the pressure all around the head with a free area in the middle.

Hueter thought that a relaxed constitution lay at the bottom of it, and that it appeared mostly in flabby children without tone.

Dr. Ed. Martin says it comes after easy births.

Fere, on the other hand, went so far as to say there was always a fissure of the cranial bones.

Hennoch's idea was that cephalæmatoma owed its origin to pressure on the skull in passing through the pelvis; a deeper, severer pressure than that producing *caput succedaneum*, separating the pericranium from the bone.

Becker's idea was similar, for he says he thinks it is due to presure of the head by the pains against a pelvic bone [Andrang des Kopfs durch die Wehen gegen einen Beckenknochen], and the bony ring is due to a bowing-in of the bone and elevation of the pericranium by extravasation.

Spiegelberg considered an interference with the circulation in threatening asphyxia the active factor, and reports cases of cephalæmatomata in asphyxiated children. He found evidence of the correctness of this interpretation in subpleural, subpericardial, and epicardial punctiform ecchymoses also found.

Schroeder, with shrewd insight, in search of an explanation, went back to the little subperiosteal ecchymosis found in almost all newborn children. A tumor of size is formed, according to his view, when an unusually large vessel is torn, or when the epicranium is but loosely attached to the bone.

Dr. F. Pauli, *per contra* (*Casper's Wochenschrift*, Berlin, 1841, No. 39, pp. 633–645), says (p. 640) that the bright-red blood which one finds soon after the formation of the tumor shows that it does not come from varicosity or the tearing of the veins.

Pajot says a pathological alteration seems to preëxist in the bone, and labor acts only as a determining cause.

Valleix laid the foundation of a clearer understanding of the immediate, if not of the remote causes, when he demonstrated the loose attachment of the pericranium in the newborn, everywhere except at the bosses and the sutures, showing too that the outer table was not yet formed in the bone surrounding the boss. He also discovered, in his researches on the development of the cranium, that there was in almost all infants an ecchymosis between this membrane and the bone after labor (*v.* Société Anatomique, deuxième bulletin, 3d series, Oct. 1835). Twenty-eight subjects, from five to forty days old, formed the basis of his examination. Seventeen presented the ecchymosis; of these eleven had the largest part of the spot on the right parietal, in two the ecchymosis was equally distributed on both parietals, in two others it was most extensive on the left, and in two it was too ill defined to fix its limits. Its greatest length was three and a half inches and the greatest breadth two and two-thirds inches. The sagittal suture was free from ecchymosis.

In three of these seventeen cases the subpericranial tissue was so engorged with blood that it could be expressed on pressure; and in two the subpericranial tissue was no longer recognizable, being ruptured and replaced by a layer of liquid blood, the veritable beginning of a cephalæmatoma.

Bouchacourt (*Diction. Encyclopédique, etc.*, Paris, 1873, No. 14) verifies Valleix's statement as to the frequency of this sanguineous infiltration after labor, and adopts his conclusions in stating that there are two factors in the production of cephalæmatoma—labor and the anatomy of the pericranium.

Dr. Ed. Martin took a similar view, connecting this disease with small flat exudates between the pericranium and the cranium so often found in the corpses of newborn children. It arises from ruptured vessels in consequence of displacement or pressure in the passage of the head through the pelvic

canal To support this explanation he cited a case of fracture of the bone with both external and internal cephalæmatoma.

Virchow (1863) states that the "cephalæmatoma arises by the separation of the pericranium from the cranium, by the rupture of the vessels which pass from the pericranium to the young bone in great numbers."

"The separation occurs during the act of birth itself by the pressure of the maternal parts on the child's head."

In considering the etiology we must further bear in mind the fact that cephalæmatoma has been observed in children born by the breech, by Naegele and Zeller, and repeatedly since their day.

Hoere gives a case occurring in 1824, in which a primipara gave birth to a weakly child in the first sacral position, and on the same day the midwife found the tumor on the head.

Ruge (*Ges. f. Gyn.*, Berlin, June 15, 1875) cites a case where a child was found in breech presentation, in a woman who had died in labor, with double cephalæmatoma.

Although many authorities have been inclined to deny the influence of trauma, too many cases of cephalæmatoma have followed the application of the forceps for this factor to be omitted as accidental in discussing the etiology of the affection.

Hoere saw three cases following the application of the forceps, but in only one did there seem to be any causal relation; here a feeble child was delivered by strong tractions. The next day a large blood-tumor was observed in the occipital region where the blade of the forceps had lain.

In another case in which Siebold delivered a lady with the forceps a cephalæmatoma developed on each parietal bone, each one of the size of half a hen's egg.

Merrem delivered a woman after violent tractions with the forceps, and the child had both a cephalæmatoma and a bloody tumor over the left eye, and died in two days of convulsions. The tumor over the eye contained about a half ounce of fluid blood, and communicated with a fracture in the frontal bone. On the brain there was about an ounce of blood.

Trefurt observed three cases of cephalæmatoma in his practice after forceps delivery.

My own case (*Medical News*, Sept. 6, 1890) was in a primipara, forty-one years of age (L. O. A.). The forceps were applied to assist an impacted head, which was thus delivered in an hour. The tumor appeared on the second day on the right parietal bone above the boss, within the grasp of the forceps-blade.

p. Diagnosis.

The diagnosis of cephalæmatoma is interesting more on account of the diseases with which it has been confounded in the past than because of any special liability at this day to confuse a disease so easily recognized and possessing such marked specific characters, with any other affection.

The earliest writers, Aëtius, Mauriceau, and Stalpart van der Wiel, in the century before the last, looked upon cephalæmatoma as a form of caput succedaneum which did not go down, and which sometimes contained blood and sometimes also suppurated.

Le Dran early in the last century unintentionally led many who followed him (Trew, Detharding, R. B., in *Gentleman's Magazine*, 1754, and others) widely astray when he based his diagnosis of *hernia cerebri* on the bony ring, concluding that the bone within was deficient.

The classification of the disease among the hydrocephali (*v.* Van Swieten and Storch) was not so great a source of confusion as it would appear to-day, for the different species of hydrocephalus were carefully defined under the two broad headings—internal and external hydrocephalus, and it was recognized that the one name covered affections generically different.

Zeller wrote: "Tumor capitis sanguinolentus ab ordinario tumore [capite succedaneo]. . His signis distinguitur.

"Tumor succedaneus non tam distincte circumscriptus, tactu mollis est, et digitis pressus subsidet in fossulas, atque 12–48 horis praeterlapsis evanescit." "Ille reperitur in ea capitis parte, quæ, antequam caput per pelvim truditur."

"Ill. Naegele vola manus admota aliquam pulsationem probe sentiebat. Cæterum tumor sanguineus pressus nec evanescit nec minuitur. Pressio nec soporem, nec paralysin, nec convulsiones, etc."

"Cephalæmatoma haud difficile a tumore distinguitur, qui telcangiektasia seu aneurysma per anastomosin vocatur. Hi tumores aut rubicundi aut cærulei, tactu in spongiæ modum molles, compressi saepius minuuntur."

"Quibus signis cephalæmatoma a sanguinis effusionibus, capitis recens natorum contusione creatis, differat, in universum facile dignoscitur. Contusionibus—Ecchymoses insignes nasci posse, notum est sanguis effusus nunc in tela cellulosa mera sub cute colligitur, nunc sub galea aponeurotica imo pericranium inter et calvariam accumulatur; cutis intumescit, dolet, rubens primo, deinde cærulea et livida aut nigricans conspicitur."

With recent history clearly in mind, Becker (1823) said that cephalæmatoma was to be distinguished from hernia cerebri by the fact that in the latter there is a hole in the bone through which the tumor is partly reducible by pressure, and a hernia increases when the child cries and struggles; it is more movable, does not fluctuate, and does pulsate. On increasing pressure the child exhibits marked nervous symptoms. The hernia is seen immediately after birth. The cephalæmatoma exhibits signs opposite to these, and pulsation is very rare.

Haller, in 1824, devotes three pages to columns showing the differential points between cephalæmatoma, caput succedaneum, and encephalocele congenita. He says that "a cephalæmatoma might well be concealed by a coincident caput succedaneum (never as yet noted), and it would be impossible to detect it for twenty-four hours."

Haller also lays stress on separating a cephalæmatoma from hydrocephalus externus, physocephalus, fungus duræ matris, læsiones capitis vi externâ illatæ [ecchymosis violenta capitis], tumores cystici et sarcomatosi.

Dubois says he does not fear confusion of this disease with hydrocephalus, and that fungus of the dura is not a disease of infancy.

The earliest writers of this century all very carefully and very accurately defined the differences between cephalæmatoma and caput succedaneum.

Busch says the caput is usually at the back of the head and extends over bones, sutures, and fontanelle. It forms in birth on the presenting portion of the head, and is bigger in proportion to the delay and difficulty of the birth. Caput succedaneum is not well defined, and has a softish feeling, pitting on pressure, but no fluctuation. It is also of a dark-blue color. It disappears in from twenty-two to twenty-four hours after birth.

Cephalæmatoma, on the other hand, appears on a part which was not foremost in birth, and oftener after easy than difficult labors, and begins to grow in the first days. It is circumscribed, fluctuates, is not impressible, and the color of the skin is unchanged. On strong pressure a pain is often felt, wanting in caput succedaneum. The bony border does exist in the caput.

Busch further considers the differences between cephalæmatoma and contusion of the head—ecchymosis violenta capitis.

"Blood tumor on occiput of the dead fœtus after difficult birth is bluish or blackish from decomposition.

"External hydrocephalus—a partial œdema in cachectic children.

"Varicose tumor, which disappears on pressure.

"Aneurismal tumor, which pulsates.

"Internal hydrocephalus, which has forced its way through

fontanelles and sutures, and which is thus situated over a suture or fontanelle and can be replaced, and

"Wind-tumor, or emphysema capitis, which does not fluctuate, is movable and crackles.

"Fungus of the dura mater, with a small base and without fluctuation, and special mode of origin.

"Fungus medullaris, which appears later in life and has no bony border.

"Fungus hæmatodes, elastic and soft, bluish or red in color, and not painful.

"Teleangiectasis, by the peculiar consistency and the color.

"Sebaceous cyst is movable and has no bony border.

"Abscess, by its previous history and termination."

Writers following Busch soon dropped the extraordinary and the rare from their lists in the differential diagnosis.

Valleix, whose clear insight is repeatedly noted, refers to cases of encephalocele, cited by Velpeau, at the centre of the parietal bone, which was perforated.

He distinguishes it from a collection of blood beneath the galea aponeurotica, in that the latter is at first ill-defined, and lies on the part of the head most prominent in birth, and is apt to overlie a suture.

In collections of blood due to violence the margins are tumefied and indurated, and painful on pressure, disappearing insensibly into the surrounding tissue, and of a doughy consistence from the serosanguineous infiltration. He cites a case of Dubois in which there was caput succedaneum, subaponeurotic hæmatoma, and cephalæmatoma.

Valleix (page 508) further cites a remarkable case, important from a diagnostic standpoint, one which, as far as I know, has never yet been paralleled. He found on the dead body of a child a few days over a month old, over the boss of the left parietal bone, a soft, fluctuating, irregularly-rounded tumor, without change of color of the skin. Around this one could distinctly feel a prominent ridge, about a line in height, of but slight breadth, and firmly-resisting pressure.

This tumor contained almost an ounce of pus. It was seated in the cellular tissue between the pericranium and the aponeurosis. At the margin of the tumor the cellular subaponeurotic tissue formed a circular cord, swollen, red, and indurated. The disease had not been noticed until the child was twenty-three or twenty-four days old, when it already had the above characters. It was then thought to be a cephalæmatoma which had escaped attention.

Valleix suggested, with reservation, that such a tumor might be differentiated by its later appearance, its slow formation, and painfulness, as well as the fact that the ring could hardly acquire the hardness of bone.

Dr. Earle, of Chicago, in 1883, added to the list of affections to be distinguished from encephalæmatoma cranio-tabes —the soft places found on the cranial bones of rickety children.

Harmuth (1889) simply says as soon as a tumor is observed on the skull which does not cross the sutures, and as soon as a bony border can be demonstrated, the diagnosis cephalæmatoma is established and sure.

q. Treatment.

It took many decades to evolve the fact that with rare exceptions the let-alone treatment was best. I know of no harmless condition which has suffered more from incorrect views as to its pathology, than the one under consideration. We have here a curious example of the trite observation that extremes meet, for under the impression that the disease was hernia cerebri, Le Dran let the tumor alone and saw it disappear; in the same way the anonymous R. B., in the *Gentleman's Magazine and Historical Chronicle*, in 1754, the earliest English observer, at first made a correct diagnosis, considering it to be an ecchymosis, and on this correct diagnosis was about to adopt an erroneous treatment and lay the tumor open, when, upon discovering the bony border, he jumped at the

conclusion that it was not an ecchymosis at all, but a hernia cerebri, and based upon this erroneous correction of his first diagnosis, he thankfully pursued the correct plan of treatment—that of letting it alone, when it disappeared. These tumors were not, however, long left undisturbed, for meddlesomeness soon asserted her rights.

Storch advised incision, and Valentini, assuring the parents that small children are more blunt to pain than adults, opened such a tumor on the head of a miller's child.

Levret advised a crucial incision, emptying the tumor thoroughly, and then closing with suture.

Smellie tells how he advised a pupil to open a tumor, and the child bled to death.

Osiander says that "when a child is born with a tumor with a hard elevated border and fluctuating in the middle, which fails to disappear in twelve to twenty-four hours with applications of cold wine, I proceed to open it with a concave bistoury. The cut should be made an inch in length, and in the direction of the striæ of the bone, and afterward dressed with a cold vinous solution. If the blood reaccumulates it must be reopened, and even opened a third time if necessary."

Michaelis, who is responsible for the diffusion of the notion that the essence of the disease was a dangerous caries of the bone, urged the same plan of treatment.

Goelis[1] in 1818 endeavored in vain to stem the *furor operativus* of his day, by substituting a plan of treatment, which although apparently mild and less meddlesome, was by no means free from danger. He used caustic on the most promi-

1 "Die Trombi der Neugebornen, wenn zertheilende Umschlaege fruchtlos angewendet werden, weichen gewoehnlich jedesmahl dem Aetzmittel, welches den hoechsten Punkt der Geschwulst in einen oberflaechlichen, eyternen zustand versetzt, nicht aber durchaetzen darf. Wagt man hier durch Trennung der festen Theile die enthaltene, meistens aus Blut bestehende Fluessigkeit zu entleeren, so wird diese sonst nicht gefaehrliche Krankheit nicht selten toedtlich. Dasselbe kann sich ereignen, wenn aus Unvorsichtigkeit ein zu grosses, weit um sich und durchgreifendes Geschwuer durch das Aetzmittel hervor gebracht wurde. Ich sah zweij Faelle der Art, die toedlich abliefen."

nent part of the tumor with a view of establishing a superficial area of necrosis and in this way causing its disappearance by counter-irritation and a derivative effect.

That serious consequences sometimes followed the adoption of this plan, he himself confessed, for he cites two cases in which the cauterization was too extensive, and both died.

Paletta, in 1820, also tried to avoid the knife and recommended a double puncture with a needle, letting out all blood, after which the tumor flows for two or sometimes three days, and then discharges serum and finally pus, resulting in cure in fifteen days.[1]

Naegele, one of the keenest observers, took a decided step in the right direction when he forbade opening the tumor before the sixth or seventh day, and after opening it was to be dressed with vinegar or wine and water, and charpie laid between the lips of the wound as a drain. Under this plan all his cases recovered quickly.[2]

[1] Apertio igitur duplicato per acum, vel per scalpellum tumore, plurimum atri et fluidi sanguinis, qui cutem distenderat, exit, quique manare pergit, sed parcius altera quoque die, interdum etiam tertia. Tum flavus humor prodit, qui nonnumquam serosus evadit, et tandem, in pus abit, ut 15 dierum spatio ex toto abscessus sit persanatus." Also: "Modus hujus mali sanandi omnium tutissimus est, si abscessus setaceo perfodiatur. Hanc viam ingressus . . . semper quam felicissimam curationem obtinui."

[2] Illos tumores cultro incidendi necessitatem minime ubique reperire. Nunquam hic apertionem justo tempore institutam noxios effectus sequi hujusque vidit; quin hanc curam tutam esse, et hac methodo sanationem maxime accelerari, pro certo habet.

Qua propter longe abest ab ea sententia, ut incisionem cultri ope omnino improbet, attamen in paucissimis tantum casibus necessarium esse censet. Quamquam observatio ei persuaserit majores etiam tumores apta medendi ratione discussos esse, atque ipsius opinione solventia initio morbi semper sine ullo periculo adhiberi possuit; tamen prudentissimum censet, hæmatomata extraordinarii ambitus atque altitudinis, e. gr. maximam ossis bregmatis partem occupantia, si dissolventibus remediis usurpatis intra decem dies aut duodecim plane non minuta sint, cultro incidenda esse.

Zeller: "Incidatur autem summa tumoris pars ope lanceolæ. Incisio pro magnitudine tumoris sat longa sit ita, ut sanguis collectus libere exeat. Sanguine amoto aliquid lintei carpti vulneris oræ imponatur, atque, ut spleniis et fascia levis pressio duret, curetur."

"Viginti quatuor horis proxime sequentibus ut plurimum liquor sanguino-

Other deaths followed the use of the caustic, and in April, 1825, Dr. Brosius wrote in *Hufeland's Journal* (p. 48) that he had tried Goelis's plan without success, and was finally obliged to open the tumor with a lancet.

Chelius, in 1829, advises fomentations for twelve or fourteen days, and then if the tumor remains tense, or is very large, it should be laid open, a compress laid over it, and a close-fitting cap tied on.

Dieffenbach, in 1830, expressed himself as utterly opposed to the caustic treatment and the use of the seton. He says with practical genius, attempts must first be made to disperse the tumors, especially in weakly children; the incision must be resorted to only in the most urgent cases. First use aromatic poultices and aromatic infusion of spices to disperse, or even a leech on top of the tumor. If the case does not improve in five to eight days, the tumor should be freely opened and washed out with warm water.

Gaussel (1837) saw a tumor disappear after a nasal hemorrhage.

Valleix (1838) says that the deep seat of the disease and the condition of the overlying tissues, afford slight ground for the action of medicaments; it is however, proper to use them in every case for a few days, as it does no harm. If the tumor be no larger than half a hen's egg, one can persist in this plan and await recovery. But if the cephalæmatoma is larger, and has not begun to diminish at the end of a few days, it is necessary to open it without delay, not for fear of caries as Zeller urges, but because the tissues at this time offer a better chance of being reapproximated. There is no need to fear hemorrhage, as the vessels are obliterated and covered with false membrane. Make an incision proportioned to the size

lentus effluit. Postero die, si vulnus denuo obligatur, capitis integumenta jam ossi parietali inhærentia invenimus; sanatio brevi tempore subsequitur."

"Cl. Michaelis tumorem primo quoque tempore aperiri jubit, Naegele vero id ante sextum aut septimum a nativitate diem fieri vetat, impulsus et propria experientia."

of the tumor; there is no danger in laying bare the bone, as the great vitality of the parts makes mortification impossible, and the reunion of the teguments easy. Incise as far as possible from the arterial trunks. After incising and emptying the tumor, place a little lint between the lips of the wound, and over this a pledget fastened in place.

Sir James Y. Simpson, 1848 (*Edin. Month. Journ. Med. Sci.*, April), said that he had an opportunity of seeing a considerable number of cases of cephalæmatoma, and he had never seen any treatment required except time and patience. The difficulty in their management generally consisted in keeping their friends and others from doing something or other to them (*v. Simpson's Obs. Works*, edited by Priestley & Storer).

Rokitansky (1855) had an exaggerated notion of the dangers of cephalæmatoma. He says: "Far more frequently, when the swelling is not opened and its contents evacuated, the inflammation becomes suppurative."

Virchow (1863), after a more direct and accurate account of the disease, says that it is, as a rule, unnecessary to evacuate the blood by artificial means; it is even injurious, as the bleeding is easily renewed. Patience, for the most part, leads to the desired end.

Pajot (1853), in his admirable thesis upon presentation of which he was elected Professor Agrégé, speaks in no undecided terms. He says, "Expectancy, resolvents, compression, caustics, setons, puncture, with and without injection, and incision, make up the various means which have been proposed and put into practice for the cure of cephalæmatoma."

He further says "expectancy is proper, nay, I believe it should be the rule, in all cases where the tumor is small or of moderate size. If the tumor persists, deep puncture with the lancet may be employed and the contents either emptied or allowed to discharge of themselves, and a dressing applied."

Hennig (1877) says we will only open a non-suppurating blood-tumor when, after eight or twelve days' waiting, it has steadily increased in size, and brain-pressure symptoms appear

which may be due to a coincident internal hæmatoma. Make a medium-sized incision about half the breadth of the tumor, under antiseptic precautions, and apply an antiseptic dressing under a cap. Where the contents are fluid, aspiration may be used. Gassner emptied a tumor, thirteen days old, of one hundred grammes of blood, antiseptically, and cured it in nine days.

Betschler, Ruge, and others have endeavored to settle the merits of treatment by incision and expectancy, in cases of double cephalæmatoma, by incising one tumor and letting the other alone, with the result that the tumor incised disappeared long before the other. I will close these references by a quotation from M. Runge (1885) which nearly embodies my own views:

"In spite of the fact experience has taught us a hundredfold, that cephalæmatoma left to itself gradually disappears by absorption," there exist a number of methods of treatment "in part coming from hungry surgeons, and in part invented by too busy doctors" (Vogel).

"I, myself, have only seen harm from opening these tumors. In several cases a threatening secondary hemorrhage came on, and it was necessary to tampon, after which suppuration naturally followed. In other cases there was no hemorrhage but there was also no adhesion, but a suppuration was established which lasted weeks and ended in death.

"I expressly warn against any surgical interference in uncomplicated cases.

"Surgical interference is only to be excused when an unusually large tumor lasts for weeks and shows no inclination to resorption. The operation is then not urgent until suppuration sets in. Puncture and aspiration are the best plan."

Many other interesting observations on the treatment of cephalæmatoma are to be found in the *Med.-Chir.-Ther. Wörterb.*, published in Berlin, 1839, and in Anton's *Heilformeln*, 1852, and Siegert's *Med.-Ther. Woerterb.*, Berlin, 1856.

r. Deaths from Cephalæmatoma.

Smellie (1770), as already quoted, advised a practitioner to open such a tumor, and the child bled to death.

Henschel, of Breslau (1826), in earnest defence of his desire to let these cases alone, cites a case in which the tumor was opened and the child bled to death on the day of the operation, in spite of every attempt to check the hemorrhage. Henschel comments on the waiting plan as "*tuto*" and "*jucunde*," in comparison to the "*cito*" of the operation.

Goelis (p. 179) saw two cases die after the use of caustic.

Osiander says he saw a death from caries where the tumor was not opened.

Paletta cites a death in his own practice.

Valleix operated on a weakly child, dividing a branch of the temporal artery. The child lost a large amount of blood and died the next day.

Dr. C. P. Noble, of Philadelphia, related to me in conversation a case terminating in suppuration, infection of the glands of the neck, pyæmia, and death.

Bednar (1850) reports two cases of death after operation, from suppuration and caries of the bone.

Kopp (1815) saw a death from perforation of the parietal bone.

Garceau (*Boston Medical and Surgical Journal*, 1872) cited a case which died of suppuration after operation, and another case in which he did not interfere, but in which convulsions set in and death took place fifteen days after birth.

Dr. Arnold stated (*ibid.*) that he had seen a cephalæmatoma occupying the frontal bone and projecting over the face. He opened it and applied tannin to arrest a profuse hemorrhage. Death ensued within a few days.

V. MEDICO-LEGAL.

The existence of a bump containing blood, on the head of a young child, to the lay mind, is almost *primâ facie* evidence of an injury received either by a blow or fall.

This fact, associated with the frequency of cephalæmatoma, and its liability at any time to be found upon a newborn child dying under suspicious circumstances, renders it a matter of urgent necessity to place the subject in its proper medico-legal relation.

The danger of unjust suspicion falling upon an innocent party was appreciated as soon as the clinical features of cephalæmatoma were commonly recognized by the medical profession, for Dr. K. C. von Klein published an important medico-legal work as early as 1817, on "the hitherto accepted consequences of the falling of children on the floor in rapid birth." Dr. Klein here gives an excellent description of cephalæmatoma, classing it as a specific disease. He lays especial stress on the important fact that although a direct consequence of the birth, it may make its first appearance from four to six days after. He pointedly remarks: "These very extravasations of blood can give rise to the most mournful errors, and the medical expert cannot have his attention too strongly directed to this subject."

In the case of a disease thus important to physicians and lawyers alike, it is, indeed, strange that as late as 1878 such a lax statement as the following could find a place in an authoritative work on medical jurisprudence (Francis Ogston, London, 1878, page 257): "Subpericranial effusions—resulting from the tediousness of the labor and compatible with its survival after birth, to which the term cephalæmatoma has been given."

More remarkable still is this strange confused statement in

Taylor's *Principles and Practice of Medical Jurisprudence*, London, 1865, p. 946, under the heading "A Protracted Delivery.—The death of a child may proceed in this case from injury suffered by the head during the violent contractions of the uterus, or from an interruption to the circulation in the umbilical cord before respiration is established. A child, especially if feeble and delicate, may die from exhaustion under these circumstances. This cause of death may be suspected when a sero-sanguinolent tumor (called cephalæmatoma, or caput succedaneum) is found on the head of a child, and the head itself is deformed and elongated."

The simple, uncomplicated, external cephalæmatoma on the newborn child can never be considered as *primâ facie* evidence of an injury occurring after the birth of the child; on the contrary, the presumption in every case is rather against such an origin of the disease.

In older children the case is different. Thus, Prof. Jacobi (*Med. Times*, May 8, 1875) exhibited a child five years old, who had a cephalæmatoma on the right parietal bone, following a bad fall. The swelling was large, fluctuating, and surrounded by a bony ridge.

While the above is true in cases of simple cephalæmatoma, the case just cited, and many of those previously recorded in this paper show that trauma may act as an efficient cause, producing a tumor in all respects and appearances like the true simple external cephalæmatoma. The suspicion of injury grows daily stronger after the first week following the birth.

Dr. C. H. Golding-Bird reports a case called a "traumatic meningocele" (*Guy's Hosp. Rep.*, 1889, p. 363), of a girl seven months old, which fell from the lap of the nurse to the floor. A small lump appeared at once, and in five to six days began to grow until it formed a large fluctuating tumor 5¼ x 5¾ inches over the right parietal bone, except at the outer upper angle. It pulsated markedly. The tumor swelled when the child cried. It had a hard crater-like edge. Exploration with a cannula revealed blood and flakes of lymph.

The little patient suffered no inconvenience from the lump. In eighteen days the tumor subsided. No trace of a fracture could be detected.

When external cephalæmatoma is associated with an internal cephalæmatoma, the two communicating by means of a fracture in the bone, the child usually dies in convulsions; here the presumption is in favor of severe injury received, either during the birth or after it.

It must be remembered that apart from the numerous characteristic signs of cephalæmatoma already detailed, bumps arising from blows or pressure commonly exhibit a marked discoloration around the seat of injury, from the infiltration of the blood into the surrounding tissues, in addition to the signs of œdema of the surrounding skin, and tenderness, the former obscuring the outline of the affected area.

VI. ADDITIONAL CASES.

I. During the present year (1890) Dr. Archibald Mallock, of Hamilton, Canada, saw a child, a year old, eleven hours after a fall, on whose head a tumor had developed, occupying the upper part of the right parietal bone, behind the boss. It was two and one-half inches in diameter, fluctuated and had a hard elevated border. The color of the skin was unchanged. The tumor was sensitive to pressure. The child was in poor health. In one week, with emollient applications, the tumor had disappeared. I saw the case with Dr. Mallock and could discover no trace of the tumor.

II. The following case occurred in the practice of Dr. George Erety Shoemaker, of Philadelphia, who has kindly written the report and placed it at my disposal. "A case of cephalic hæmatoma:" The mother was a full-blooded negress, primipara, aged twenty years. Labor was normal: no instru-

ments were used. The child was small though not emaciated. It seemed from birth to be under the influence of some cerebral disturbance.

Soon after birth a hæmatoma two and a half inches in diameter was noticed on the right parietal bone, with hard, elevated, sharp-cut edges which gave the impression that an opening existed in the skull. This swelling constantly increased in size till death occurred on the third day. For the first twenty-four hours, mucus deeply tinged with blood flowed from the mouth. The umbilical cord, though carefully tied, bled on the second day, and though again tied, needed after some hours a third ligature, which finally controlled the oozing. Very deep jaundice appeared on the second day. The following conditions were present from first to last: The eyes were tightly closed; both hands, forearms, and arms were in a state of tonic spasm; the respiration was shallow and gasping; no effort was made at suckling, nor would any food be swallowed; at intervals a peculiar short cry was uttered.

The post-mortem, unfortunately not complete, showed a hæmatoma under the periosteum of the right parietal bone without communication with the brain cavity.

Death was apparently caused by a general effusion of blood beneath the dura mater. No separate clots were found.

III. Cases of cephalæmatoma observed by C. C. Frederick, M.D.:

M. S., aged twenty-five, American, primipara, was delivered January 29, 1882, of a male child, weighing eight pounds. The vertex, at first right posterior, rotated to vertex right anterior at lower straits. The labor-pains were strong and rapid. The second stage was longer than usual because of third position. No forceps were used. Exact length of second stage of labor not noted.

January 30th, tumor appeared upon left side of head near the sagittal and lambdoid sutures, accompanied by convulsions. Tumor, fluctuating, advanced over nearly the entire

parietal bone. Convulsions continued, coma and death February 2d.

Autopsy, February 3d. *Blood-tumor between the left parietal bone and the pericranium, communicating with an effusion of blood found between the right parietal and dura mater.* The point of communication seemed to be near the posterior bregma in the sagittal suture. A slit torn through the longitudinal sinus a few lines in length. The clot beneath the pericranium was smaller than that upon the dura, and both were black.

Mrs. R. S. A., aged twenty-four, American, primipara, was delivered February 22, 1890, male child, vertex left anterior. First stage tedious, membranes having ruptured early in labor. Duration of first stage fifteen hours.

Feeble pain in second stage rendered forceps necessary, while the head was at the middle straits. Delivery under chloroform. Noticed ptosis of right upper eyelid of the child twelve hours after labor. The forceps-blade made a slight cut over the right frontal protuberance.

February 23d, tumor soft, fluctuating, appeared over right parietal protuberance, size of a silver dollar.

February 24th, tumor had increased in size, extending forward to the cut upon the frontal bone, from which black venous blood oozed. Made pressure over this cut by iodoform collodion and absorbent cotton to prevent further hemorrhage. By February 25th the tumor had advanced over the entire head from nape of neck down to the ear on each side, and into the orbits, having crossed all the median sutures of the skull.

February 26th, the child died. No autopsy. I am convinced it was a blood-tumor, because of the blood having escaped from the cut upon the forehead for several hours. I think the child died from the amount of blood lost through this wound and beneath its scalp. It had no convulsions or other signs of intra-cranial pressure.

Mrs. A. H., aged twenty-three, American, primipara, de-

livered February 22, 1890. Male child, vertex left anterior, perfectly normal labor, no forceps used.

February 23d, nurse called my attention to a fluctuating tumor upon the child's right parietal bone, over the tuberosity, the size of a silver dollar or larger. The edge of the tumor was sharply defined as by a bony ring. In six weeks the tumor was entirely absorbed, leaving a slight periosteal thickening over the site.

VII. CONCLUSIONS.

While it has not been my object to bring forward any new facts relative to cephalæmatoma, I have thought it equally important, and I hope in this that I have been successful, to present a picture of the disease, in many interesting particulars widely differing from that found in any of the various text-books of to-day. We have thus seen upon the most reliable testimony that there is not a single sign looked upon as characteristic, which is invariably present, or which may not in some rare instances assume another appearance, suggestive of a different affection.

Thus, the common time of the appearance and formation of the cephalæmatomatous tumor, which is after birth, does not always hold good in indicating the diagnosis of a cephalæmatoma as distinguished from a congenital tumor like hernia cerebri, for the exceptions quoted showed that cephalæmatoma may even exist before birth, and be felt in the maternal passages.

The absence of color does not always distinguish it from a suggillation or a bruise, for it in some instances is of a livid or red color.

Fluctuation does not always show that the contents are fluid, for they are rarely coagulated.

The bony ring itself is sometimes wanting for a time, and

in Valleix's case there was even a hard ring surrounding an accumulation of pus above the pericranium; in one case of true cephalæmatoma the child died before the ring formed. The crucial test, that the tumor never crosses a suture, has also failed in a few instances, still open to doubt as to the exact seat of the effusion.

It is therefore at once clear from all these statements that no one sign makes a diagnosis more than probable—it is the conjunction of signs, taken with the history of the appearance and development, which go to make the diagnosis.

An evident discrepancy exists between those cases which were evidently due to trauma (as in the forceps cases cited), and the large number of cases following easy labor; we need at this point more exact observations to determine what is the proportion of forceps cases, and stating exact site of the tumor on its first appearance, whether within the grasp of the blade of the forceps or not.

Careful post-mortem should be made in all cases when possible, but most of all in those which cross a suture, and in cases which have presented brain symptoms to determine in the first instance whether the fluid really lies between the pericranium and the bone, or between the pericranium and the galea aponeurotica.

When we bear in mind the frequency with which external and internal cephalæmatomata are associated, together with fracture of the bone, it is evident that we are not warranted in unhesitatingly offering so favorable a prognosis as has been the custom, until by a more careful inquiry we have excluded the probability of a coincident accumulation within the cranium.

Much is still obscure in the etiology of this affection, and we are not yet warranted in reaching a positive conclusion; many clinical facts point to the resistance offered by the cervix uteri as the prime cause—a conclusion which I think at first sight seems improbable. Such facts as the following all point in this direction—most cases occur in primiparæ, boys are oftenest affected, and it is found by preference on the right

parietal bone, on the part of the head most subject to pressure from the undilated cervix, before flexion has occurred, there is also the great preponderance of the left occipito-anterior position over all others, explaining the position of the tumor. All these points unite to heighten the probability of this view of Valleix's.

We must remember, too, that this area, thus exposed to pressure early in the labor, is exactly that in which we habitually find the ecchymotic spots after natural labor. Cases of twins, in which one is affected, ought to be carefully noted and reported, as it would be an important additional evidence, if it were found that the first twin born was always the one affected, because of the passage of the second through the already dilated cervix, which therefore offers no resistance. That other far different causes may operate is manifest from the cases of forceps labor quoted, from the numerous cases occurring in older children, or even in adults cited above.

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DISCUSSION.

Dr. W. W. Jaggard, of Chicago.—I was not aware until this afternoon of the pathological dignity of external cephalæmatoma. In a slight degree it occurs in more labors than mentioned by Dr. Kelly; but if not disturbed, the tumor commonly disappears spontaneously in a few days or weeks.

The internal variety, in which the extravasation of blood is between the inner layer of the periosteum and the bone, is more serious, and sometimes results in strabismus, convulsions, and death. This variety is usually difficult of diagnosis and is impossible to cure. A very interesting account of this internal variety of cephalæmatoma, by Partridge, appeared not long ago in the *Obstetrical Journal*. Dr. Keating (*Archives of Pædiatrics*) also gave an account some years ago; Ingersoll reported cases in the *Transactions of the Illinois State Medical Association*, for 1884.

I would like to criticise two statements in the paper. Dr. Kelly says it is "a well-defined disease appearing soon after birth;" and "Injury usually has no apparent connection with the origin of this tumor, which often appears after natural, easy, and short labors, and upon a part of the head which was not prominent in birth." That statement is not exactly correct; the injury always does occur during labor. It is due to the small subperiosteal hemorrhages which occur to some degree in almost every natural labor. It is essentially traumatic in origin. In about the proportion of cases mentioned by Dr. Kelly it reaches a perceptible size, but some slight periosteal hemorrhage is almost always present in normal labors. It is remarkable, however, that cephalæmatoma is nearly as frequent in the after-coming head and in transverse presentations as when the vertex presents.

Dr. Edward W. Jenks, of Detroit.—There is one work to which Dr. Kelly has not alluded that attracted my attention as long ago as 1868, and that is, Bouchut's *Diseases of Children*. If I recollect correctly the edition was the English translation by Bird. My attention was attracted to it at that time on account of some cases coming under my observation.

Bouchut describes very graphically the bony ridge spoken of by Dr. Kelly, but if I recollect correctly his prognosis of these cases was very unfavorable. He dwells at considerable length upon the differential diagnosis between the genuine and spurious, the spurious being nothing more or less than the ordinary caput succedaneum. In the matter of treatment he recommends nothing, although he refers to the different kinds of treatment that have been instituted.

Dr. William M. Polk, of New York.—I did not hear all of Dr. Kelly's references in his bibliography, but I suppose he included American observers. I think if you refer to Dr. George T. Elliott's work on *Clinical Obstetrics* you will find some report of cephalæmatoma. In my student days one of the terrors that used to be held up to us was that theme *versus* the ordinary caput succedaneum. Many and many a day have I seen the learned professor (an ex-member of this Society) stand before his class and strike terror into the heart of the medical student upon this very subject, and the worst of it all was the word itself, which we found more difficult to pronounce than any other he presented to us.

Dr. Frederick, of Buffalo.—In talking with Dr. Kelly upon this subject of cephalæmatoma I chanced to refer to several cases in my experience of the last ten years, the histories of which he thought were remarkable, and asked me to present them to you this afternoon. They are as follows:

Mary F., twenty-five years of age, primipara, was seen January 29, 1882, in the first stage of labor, the vertex position being right occipito-posterior. The pains were rapid and severe. Forceps were not used, the head rotated and came down to the inferior strait in the second position and was delivered. On the 30th, the next day following labor, the child was taken with convulsions, and a cephalæmatoma was found upon the left side near the edge of the sagittal and lambdoidal sutures, which rapidly progressed during the next twenty-four hours, covering a good share of the left parietal bone nearly down to the left ear. Convulsions continued to recur and the child died on the 2d of February at the age of four days. Nothing was done, because it was considered to be a hopeless case. The autopsy showed that

the pericranium was lifted from the left parietal bone by a blood-clot, while between the right parietal bone and the dura mater was a large blood-clot or internal hæmatoma. This effusion of blood between the right parietal bone and the dura mater caused pressure, convulsions, and death of the child.

On the 22d of February, of the present year, I attended a small primipara, twenty-four years of age, in a long and difficult labor. The first stage was very protracted on account of a rigid os, and after an hour and a half of severe expulsive pains, the child's head being in the occipito left anterior position, was delivered with short forceps. The child was a male, weighing eight pounds. The next day there appeared over the right parietal eminence a small tumor which had the characteristics of cephalæmatoma, especially that of the clearly-defined bony ring. This cephalæmatoma advanced up over the parietal bone and came down to a cut on the right frontal protuberance that the forceps had made there, and began to bleed. I applied an antiseptic dressing to stop the bleeding, because the child seemed weak. The cephalæmatoma continued to progress downward over the temporal bones into the orbits and across the sagittal and lambdoidal sutures, and finally over the whole head. Dr. Tremaine, of this city, saw the case in consultation with me and advised letting it alone, and the child died February 26th, four days old. I removed the dressing from the wound that the forceps had made on the frontal protuberance, and pressed some blood out. The parents did not desire a post-mortem and I did not open the tumor, but I am satisfied that it was a collection of blood.

Strange to say, on the same day I attended another woman, twenty-three years of age; I did not use the forceps as the labor was not unusually severe. There developed the next day, upon the right parietal eminence of the child's head, a tumor which increased to about one and a half times the size of a silver dollar, with clearly-defined edges having a bony feel, and, contrary to the ordinary appearance, there was present in this one a bluish discoloration. In about six weeks the tumor had entirely subsided, and the last time I saw this child, about six or eight weeks ago, there was nothing left but a little thickening of the periosteum over the area which this hæmatoma had covered.

I report these cases at the request of Dr. Kelly, because he thought that they were rare. I have never looked up the literature of the subject, and I was not aware that they were so very rare.

Dr. Kelly.—That traumatism is the basis of the injury is an old and most natural supposition, but it takes more than this to explain these injuries, for they do not necessarily follow severe labor or the use of the forceps. They have been frequently observed after labors which were characterized as simple and easy. They have also been detected on the head of the child before birth, and even on the head of the fœtus of five or six months, and furthermore, a cephalæmatoma has been observed on the head of a child born by Cæsarean section; so it is clear that there is something more than simple traumatism back of it. Predisposition must exist for traumatism to provoke. The etiology of cephalæmatoma is by no means an exhausted subject.

I know of a single case parallel with Dr. Frederick's, in which the cephalæmatoma developed on one side of the head, passed through a suture and under the bone, between the meninges and the skull on the other side of the head. Dr. Frederick's independent report is valuable confirmatory evidence.

THE COMPARATIVE VALUE OF THE BINIODIDE AND BICHLORIDE OF MERCURY AS SURGICAL ANTISEPTICS.

By Charles Jewett, M.D.,
Brooklyn, N. Y.

For chemical antisepsis the bichloride of mercury has come to monopolize the attention of surgeons almost to the exclusion of other chemical agents. Yet in the biniodide we have a germicide equally potent if used in proper concentration, and at the same time possessing important advantages over the former salt as a practical antiseptic.

A serious defect of the sublimate is its comparatively unstable character as a chemical compound. It is promptly decomposed when the solution is brought in contact with ordinary metallic instruments, common soaps, or albuminous fluids, and is gradually reduced to calomel in the presence of certain other organic bodies. It must frequently happen in practice that the trusted solution has long since become inert, not to speak of the injury done to instruments.

The addition of certain acids prevents the precipitation by albumen, but it renders the solution more unpleasant to the surgeon's hands, and greatly accelerates its decomposition in the presence of ordinary metals. The biniodide, on the other hand, is comparatively stable. Its solution is not destroyed by soap or albuminous fluids, and it is more feebly affected by metals. Steel instruments may be left lying for a few minutes in a one in two thousand solution without material harm, and may be brushed and sterilized with it in prepara-

tion for use. The slight bloom which appears after a time may be wiped off, leaving the polish intact.

If a polished steel instrument be dipped in a solution of the mercuric iodide, and another in a neutral sublimate solution of equal strength, the one in the sublimate will begin to blacken some time before any change is perceptible in the other. If the sublimate be acidulated the blackening begins instantly.

A more important advantage of the iodide solution, when neutral, is its permanence in the presence of albuminous fluids. This is a matter of some moment where the antiseptic solution is liable to be soiled with blood in redipping the hands, or when it is used for irrigating or bathing bloody surfaces. The relation to soap is not so material, since soap contact may be prevented.

It is the writer's belief that the latter salt is less toxic both as an irritant and a systemic poison than the sublimate. At least one authority, Brunton, fixes the maximum therapeutic dose at twice that of the perchloride. This claim, however, needs confirmation. That the biniodide is less irritating than the corrosive chloride to the surgeon's hands, to wound surfaces, and to mucous membranes, can scarcely be questioned.

Its rank in the list of recognized germicides has not yet been so definitely determined as has that of the sublimate. Eminent bacteriologists have rated it above the bichloride. Others have dismissed it with a passing mention.

For the writer it has for several years replaced the bichloride as an obstetric and surgical antiseptic, and with even greater satisfaction than formerly had with the latter salt. Competent testimony from various sources speaks for its value from the standpoint of clinical experience.

The investigation which forms the principal subject of this paper was undertaken for the purpose of reëxamining the question of the comparative potency of the red iodide and sublimate as practical germicides. The work was conducted by Dr. W. E. Butler, at the Hoagland Laboratory, under the

supervision of Dr. B. M. Bolton, Director of the Department of Bacteriology, to whom the writer is indebted for their interest in the research and the special skill bestowed upon it.

The aim was to give the work as practical a bearing as possible. The conditions were therefore made to conform as closely as practicable to those of the operating-room. The technique of hand-cleaning was selected as a practical test of the sterilizing power of the agents under investigation, but was applied to the skin of the dog instead of the operator's hands. The required conditions were thus fulfilled with the least inconvenience to the operator.

Four patches upon the dog's body were shaved and washed. Upon the surfaces thus prepared the infectious organisms were placed, and after being allowed to dry on, the parts were subjected to the usual technique of hand-disinfection.

The staphylococcus pyogenes aureus was used as the infecting organism. The streptococcus was tried, but was found too slow of cultivation and was abandoned. In a small number of experiments the staphylococcus albus was employed, but the results did not differ essentially from those obtained with the aureus, which in fact was believed to represent fairly the entire group of pathogenic organisms for the purposes of the investigation.

A pure culture of the staphylococcus suspended in sterilized water was painted with a stiff brush upon the four shaven patches and allowed to stand for ten minutes in order to sink into the skin. Scrapings were then taken from the four patches with a sterilized scalpel and cultured to demonstrate the presence of the germs. A growth of the organism chosen for the experiment was obtained in every instance The infected surfaces were then, in all the experiments, scrubbed for from two to three minutes with soap and water and a hand-brush. The soapy water was rinsed off by irrigating for one minute with a stream of plain tap water. A culture was again made from scrapings taken after rinsing off the soap.

In a portion of the experiments, after the removal of the

soap, the parts were rubbed for one minute with a cheese-cloth wet with alcohol, and another culture made. Finally, the mercurials were applied. The surfaces were irrigated with the solutions for different lengths of time in different experiments, varying from three-fourths to two minutes, and the solutions were then left standing on them for the same length of time. Two patches were treated with the iodide and two with the chloride in each observation. The proportions of the chemicals were, in case of the former, 1 in 2000 and 1 in 4000; in the latter, 1 in 1000 and 1 in 2000.

In several instances the parts were scrubbed with a brush during irrigation with the mercurial solutions. The mercurials were washed off by irrigating the patches for one minute with plain tap-water, and a final culture made in the same manner as before. Scrapings obtained with a flamed scalpel were planted in agar-agar tubes, which were kept at incubation temperature for twelve hours, and subsequently watched for two or three days.

Where colonies developed they were microscopically examined for the organism employed in the observation. Accurate records were kept of the conditions, and all the data pertaining to each experiment.

The total number of observations was 264. Of these only 226 were regarded as reliable for the purpose of the investigation. From the tabulated results of the 226 experiments the following conclusions may fairly be drawn:

1. In equal concentration the biniodide is slightly inferior to the bichloride in germicidal power.

2. The difference in the efficacy of a 1 in 2000 and a 1 in 1000 bichloride solution is insignificant.

3. The activity of a 1 in 2000 solution of the biniodide is materially greater than that of a 1 in 4000 solution.

4. For equal potency as a sterilizing agent the biniodide should be used in little greater concentration than the bichloride, presumably 1 in 1800.

Aside from the special object of the investigation, Dr. Butler's tables are of interest in connection with the general question of antisepsis. In no one group of experiments did the percentage of aseptic results exceed seventy-five. The results show that while sterilization is possible with the technique employed, it is not certain. Is certainty attainable by any method that shall be practicable for the operating-room? The writer believes it is, but the method has yet to be formulated.

Time, the degree of concentration of the agents employed, and attention to mechanical and chemical details must undoubtedly be important factors in a competent technique. Our tables show a marked falling off in results when the time for the action of the mercurials was reduced below three minutes, a small gain when it was increased to four. Burrell and Tucker found sterilization complete in every instance by concluding the usual process of hand-disinfection with immersion for one hour in a 1 in 1000 corrosive sublimate solution. Whether the time may be reduced within practicable limits they did not determine.

The percentages were improved by scrubbing during the antiseptic irrigation. The use of alcohol immediately before the sterilizing solution made a material improvement in the figures. It acts, doubtless, by removing water from the tissues, rendering them hygroscopic, and thus promoting the absorption of the antiseptic solutions.

Ether employed in like manner appeared to have no effect on the results. No advantage was noted for green over common soap, and no difference was observed in the results on varying the temperature of the mercurial solution from 100° to 70° F.

It was the chief object of this paper, however, to draw attention to the mercuric iodide as a surgical antiseptic. Comparing favorably as it does with the sublimate in sterilizing power, its advantage in other particulars should give it the preference for general surgical use.

A REPORT OF MY RECENT EXPERIENCE IN RESTORING LACERATIONS INVOLVING THE SPHINCTER ANI, BY THE FLAP-SPLITTING METHOD.

By Horace Tracy Hanks, M.D.,
New York.

The existence of very many specifics for a certain disease is a good argument, in the mind of a wise physician, that none of the many *are* really specifics. So too, when many different surgical operations are resorted to for the cure or relief of a certain lesion, each earnestly recommended by the supposed deviser of the operation, it is quite probable that not one of the many methods is as successful as its sanguine author would have us believe. Still, when but few are satisfied with the present results of a therapeutic agent or surgical operation, we are all justified in our efforts to find something better. And, therefore, to-day we are almost too willing to give up the old method for the new, without the theoretical or clinical proof that the latter is the better. But when there *is* convincing evidence that an improvement has been made in medicine or in surgery, we have arrived at that happy stage when no prejudice, stupidity, or ethical code is a sufficient excuse for our non-acceptance of the fact. Never was there a time when the maxim "Sui non proficit, deficit" was more literally true than with us to-day, in our profession.

There have been very many slightly different operations recommended for the restoration of the torn perineum and sphincter ani in the female. After each method there have

been successful results. The Baker-Brown quill-suture operation, the Thomas, the Emmet, the Schroeder, my own method with the change in the after-treatment, and later the very similar method by Skene. Every one of these methods has had its earnest advocates, and could the operation always have been done by a wise surgeon, and the patient nursed by a reliable nurse, excellent results would have been the rule, especially if they had adopted the after-treatment advocated by me (see *New York Med. Record*, July 1, 1882), of keeping the bowels loose for ten days after the operation. But such was not the case. The country physician saw Brown or Emmet or Thomas operate, and went home and operated himself. He was not always a wise surgeon, or good gynecologist, and the work was not well done. And he did not have a Margaret, of twenty years' experience, to nurse the patient, and protect the perineum when the bowels were first moved on the eighth or tenth day. Consequently three cases out of every four were failures.

These facts induced me to study this subject most carefully, and I thought I had made some improvements in the technique of the operation, and in the after-treatment, when I wrote my first paper on this subject in 1882. The change in the after-treatment as advocated by the late Dr. Dunster and myself in the United States, and by Allingham and Edis in England, has had a very happy effect upon the results of the operation by all gynecologists. But a different method of operating has been practised by Mr. Tait, and advocated by those who have seen him operate. My belief that this operation, when perfected, and I hope I shall help to perfect it, is the best yet devised, is my only reason for preparing this short paper.

Within the past year we have had this operation described with cuts to illustrate it, by Fancourt Barnes (*International Medical Annals*, 1890, p. 363), by Mundé, with two beautiful chromo-lithographic plates (*Amer. Journ. Obstet.*, 1889, p. 673), and by Macphalter (*Amer. Journ. Obstet.*, 1889, p. 1146). We

have also had, in the past few years, more or less carefully prepared descriptions of this method of operating, by Sänger, Martin, Johnstone, and others. I desire to help to make the different steps of the operation even more plain than has yet been done, to the end that it may be performed successfully by any intelligent and wise physician and surgeon, even though he may not be a professional gynecologist.

From an experience of four years in this method of doing the operation, I am convinced that it is the most simple to do, most quickly done, and most sure in its results. Certainly, if such are the facts, it is *the* operation *par excellence*. I have *not* performed this operation during this time to the *exclusion* of all other methods, but I have faithfully compared the results of the old and of this new method, by operating often on the same day by both methods in the Post-Graduate Hospital, in the Woman's Hospital, and in private practice.

The results of the flap-splitting operation, when the tear extends through the sphincter, have been so much better than formerly, that I shall not resort to the former method again unless new complications arise and unexpected results follow. My last five operations for restoring the perineum where the sphincter had been involved have been done by the latter method, and there have been no failures, but, on the contrary, each operation has been followed by most excellent results.

Case I.—Mrs. R., forty-three years of age. Laceration extending through sphincter, occurred six months before, in her first confinement. Very great relaxation and eversion of vagina. Assisted by Drs. Talbot and Lloyd, I operated Nov. 15, 1889. Usual preparation, and flap-splitting operation as here described. Five silkworm-gut sutures used. Suture removed on tenth day. Some cutting around anus by lower suture had taken place, but the union of sphincter and perineum was perfect, and has so continued.

Case II.—Mrs. C., mother of five children. Laceration with second child. I restored the parts by the Emmet method, at her

home, after one failure in the Woman's Hospital, by the same method. With her third child she suffered a second laceration through the sphincter. She conceived again before an operation was performed, and again after the fourth child; she soon became pregnant, and was safely delivered of her fifth child two weeks before this operation. Did not nurse the child.

The sphincter and one inch of the rectum were involved in the laceration. Usual operation, Drs. Abbott and Lloyd assisting. The rectal wall was sewed as pictured in Fig. 3, R, with No. 1 catgut, continuous suture; silkworm-gut sutures to sphincter and perineum. Bowels kept loose for ten days, when external sutures were removed. Perfect result.

Case III.—Mrs. K., patient of Dr. Robinson. Was nursing her six months' old child. Laceration extended completely through sphincter, but did not involve the rectal wall. Operation May 6, 1890, at the Post-Graduate Hospital, before a full class. Dr. Boyd, of Albany, Dr. Robinson, and Dr. Bullard present. The usual flap-splitting operation. Silkworm-gut sutures for sphincter, catgut sutures for perineum. Patient's bowels kept loose. Suture removed on tenth day. Patient discharged cured fourteen days after operation, with perfect control over sphincter.

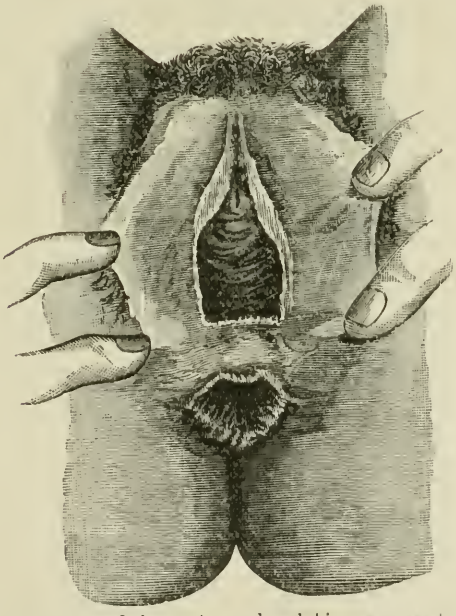
Case IV.—Mrs. S., patient of Dr. Jackson, not fully recovered from a very severe labor which occurred nine weeks previously. Laceration extended through sphincter and up rectum for one inch. Operation June 11, 1890. Present: Drs. Jackson, Lloyd, Aspell, and Gunning. The illustrations here shown are from drawings made at this time by my friend Dr. Aspell, and represent exactly the conditions before, during, and after the operation. (See Figs. 1, 2, 3, 4.) The usual catgut suture was used in rectum, after splitting the septum. (See Fig. 3, R.) Silver wire to secure the sphincter, fastened with lead plate. (See Fig. 4, B.) For perineum, a No. 4 catgut. (See Fig. 3; 1, 2, 3, 4, 5.) Bowels kept loose. Sutures in sphincter removed on tenth day. Result perfect.

Case V.—Mrs. C., patient of Dr. Fanning. Sphincter torn with first child. No operation. In her second labor, three days previous to this operation, the laceration had extended up the rectal wall a full inch. Operation June 1, 1890. Drs. Fanning, Tal-

bot, and Young assisting. Operation as usual when rectum is involved. Silver wire used in sphincter, and catgut in perineum, She had frequent diarrhœal passages each day, until sutures were removed on the tenth day. Result, a perfect sphincter and perineum.

I have never performed this operation, where the sphincter is involved, in seven or ten minutes. I do not recommend it because Mr. Tait, or anyone else, can do it in five minutes. But I do recommend the operation, because when it is well

FIG. 1.



Appearance of the rupture when labia are separated.

done, as here described, it is less tedious, less difficult, and more successful than any other. I would say in passing, however, we have no right to undertake *any* operation, unless we are prepared to give it *all the time* it requires. I saw Mr. Tait, in his own hospital, do a perineorrhaphy in from five to

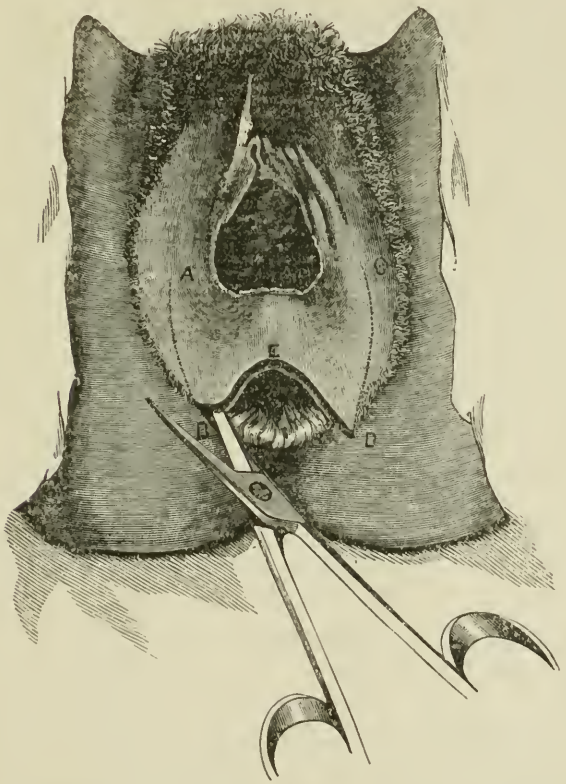
seven minutes. It would have been done better, even by him, had he spent twelve minutes in doing it.

I prepare my patient in the usual manner, having her in the best possible physical condition, by judicious feeding and tonics. Bowels to be thoroughly moved each day for several days. The rectum to be thoroughly unloaded with an enema on the morning before the operation. The hairs to be removed from labia and mons with scissors or razor. The parts well washed with a germicide fluid (bichlor. 1 to 1000 or 1 to 2000). When the patient is on the table, well anæsthetized, and in the lithotomy position, the vagina and rectum should be well douched with bichloride 1 to 4000. Then I fill the upper rectal pouch with a few cotton balls which have been soaked in and wrung out of hot antiseptic water. These balls should be attached to one string, in such a manner that traction on the string will remove them one at a time, until all are removed. There should be an assistant on each side, to steady each thigh. The parts should now be thoroughly examined, and the open, everted vagina and rectum should be firmly pressed with a napkin wrung out of hot water, that the exact location of the cicatrix, and the condition of the vagina, may be ascertained. Then with tenacula inserted at the parts which represent the caruncule, the labia must be approximated, and the vagina thus closed for inspection. Only by this careful examination can it be determined where to begin, and how deep, and how far, to extend the incisions.

In order to avoid any delay which would be occasioned by the bleeding from the perpendicular cuts parallel to the nymphæ, if these were made first (see Fig. 2, C, D, and A, B), I always begin the operation by making an incision with scissors near to, but below the end of the torn sphincter on the patient's left, as represented in Fig. 2, and cut or split the rectum from the vagina, from the torn sphincter, up to the angle of the tear, E, in the recto-vaginal septum. (See Fig. 2, D, E.) I then split it for a full half-inch at the angle E, which must be done carefully and methodically, so as not to

cut down into the rectum, or up into the vagina. Then I begin on the opposite side of the anus at B, and cut up toward the angle of the tear, E, in the recto-vaginal septum in a similar manner.

Fig. 2.



Showing line of first incision with scissors. D, E, B, recto-vaginal septum—which has been split from D around angle E, and down to B, on the patient's right. D and B are on a level with floor of anus. C D and A B, direction of upright incisions.

And just here we find is one secret of the success of this method of operating. Instead of denuding and removing the edge of this recto-vaginal septum around E as formerly,

leaving but a thin edge with which to repair the weakest of all the parts to be repaired, I now split this tissue of the recto-vaginal septum for one-half inch, and in this new method have two flaps of one-half inch each, and thus a full inch, with which to repair this portion of the lesion. These slits can be made with the usual sharp-pointed, straight scissors, or with almost any pair of scissors or scalpel, with which one is in the habit of working. It is very necessary that a careful inspection should be made before any cutting is resorted to, that the points where it is necessary *to cut* may be fixed in the mind of the operator before beginning.

The location of the points, *B* and *D*, to the right and to the left of the anus, where I begin this incision, must be on a level with the lowest part of the anus; otherwise the fibres of the external sphincter will not be caught. An incision fully a quarter of an inch deep will generally be required to accomplish this purpose. The ends of the sphincter must be reached, whether the incision has to be deep or shallow. After these, incisions at B and D to the right and left of the anus are made, and the recto-vaginal septum around the angle E has been split for a full half-inch, and the parts have been in the meantime thoroughly irrigated with hot water, the vertical incisions at the points marked C and D and A and B in Fig. 2 should be made. These are to be fully one-quarter of an inch deep at their lower ends, but not so deep at their upper ends. Then with scissors or scalpel, or handle of scalpel, dissect back for a little distance under the tissue, which makes the flaps marked E, D, C, and A, B, E, in Fig. 2. The parts are then prepared for the sutures. There will, in this way, be no loss of tissue, unless it may be found necessary to remove a couple of little tags from the flaps, in order to make the parts coaptate more perfectly.

In Fig. 3 Dr. Aspell has shown the exact appearance of the parts when four tenacula are inserted, and the parts are put on the stretch. This figure shows how the rectum appears after I have sewed up the rectal wall to the anus, with a No.

1 continuous catgut suture (Fig. 3, R). This I always do when the rectum is involved for more than half an inch. I believe we may and do have many successes without this step,

Fig. 3.

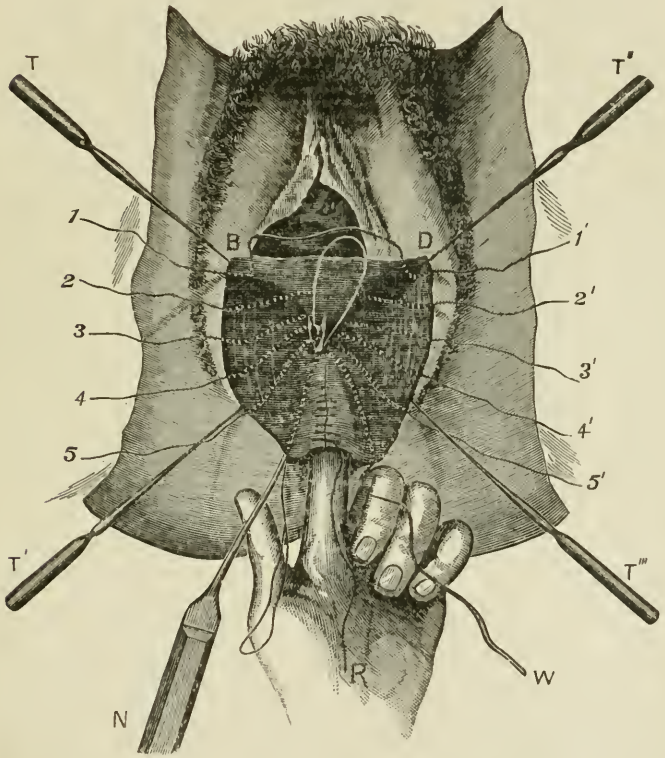


Fig. 3 shows wound fully opened with the four tenacula, T, T′, T″, T‴; N, the Hanks-Peaslee needle, with carrying thread, for drawing the silver wire W. This *first* suture must be deep enough to catch ends of sphincter on either side of anus. Dotted lines 1, 1′ and 2, 2′, etc., indicate directions of later sutures.

but I am sure I have many successes with it; and I know it is better surgery, and takes but a few minutes to do it, and do it well.

In placing the most important suture of all in this operation, I use a delicate Hanks-Peaslee needle, with carrying

thread. However, a common, small Peaslee needle, or a long, delicate Hagedorn needle, or a small, round-pointed needle, slightly curved, will answer the purpose.

Under no circumstances should a large needle be used, but every precaution taken to avoid an unnecessarily large puncture. The very important rule to follow is to insert the needle-point even lower than is indicated in Fig. 3. In this case the Hanks-Peaslee needle was inserted and the silver wire was threaded into the carrying thread at the angle of the recto-vaginal tear (see Fig. 3), and on the withdrawal of the needle the silver wire was left *in situ* on the left side of the laceration.

It will be noticed that the first suture enters the undenuded tissue on each side below the level of the anus. It enters the parts which have *not been* denuded; the figure is slightly at fault here. The needle must be passed downward at first, that there may be no doubt about catching *all* the fibres of the sphincter ani, and continued downward until it reaches and includes in its sweep a few fibres of the levator ani muscle. Its point must be carefully guided in its progress upward toward the angle of the laceration by the second finger of the left hand of the operator, which is inserted in the rectum. The figure is here again at fault—the *second*, not the *first* finger, is the finger to use in the rectum. This finger can and ought to be kept there during the insertion of all the other sutures. After the first or second suture has been inserted a long curved needle can be carried directly around to the point corresponding to its entrance. At first, however, if the rectum has been badly lacerated, it is much safer to insert the needle twice in introducing one suture. After the silver-wire suture, or the sutures which are to catch up the fibres of the sphincter, has or have been inserted, using one or two silver wires as may be necessary, the remaining sutures should be inserted at and make their exit from the *edges* of the wound on either side. No skin need be caught in any but the sphincter sutures. These upper sutures can be, and

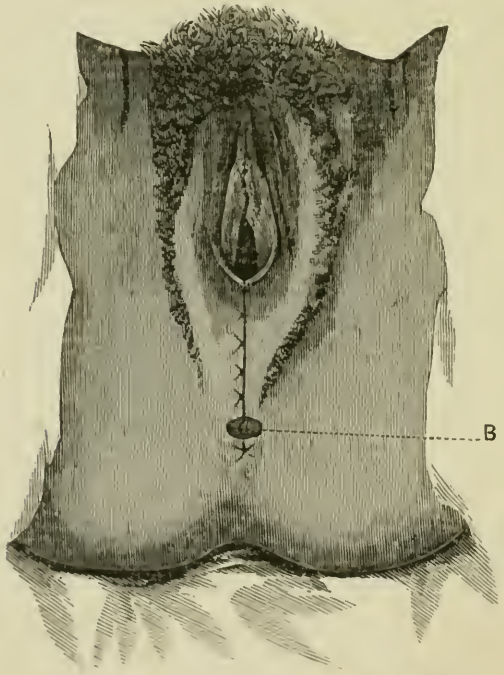
I believe should be, of the best No. 3 or No. 4 catgut. There should be four or five of these catgut sutures. (See Fig. 3, 1, 2, 3, 4, 5.) In inserting the needle, great care should be exercised that it takes and keeps the proper direction, that all unnecessary wounding of the delicate tissue around the recto-vaginal septum may be avoided, that as little traumatism as possible may be produced. Several failures of which I have been cognizant, I believe were due to unnecessary punctures with too large a needle, whereby a small vessel was wounded and a clot of blood left to become a focus of inflammation.

It is not so much the variety of the suture material used, if it is aseptic, as the manner of its insertion, which is all-important. The upper catgut suture (Fig. 3) can be inserted first at a point in this upper flap midway between A and C, thus completely closing the floor of the vagina at this point with a catgut suture. Fig. 4 represents the exact appearance of the parts after all sutures have been tied and the ends of the silver wire have been passed through the lead button (Fig. 4, B) and twisted *outside* the button. This button may not be necessary, but on several occasions I have found this suture has been inclined to cut, from the great strain upon it, and I therefore use a small lead button with two holes in the centre for the wires, and have found that it has occasioned no discomfort, and has not only prevented the suture from becoming embedded in the soft parts, but it has also prevented the constant pricking of the ends of the wire or silkworm-gut. This button is made of thin lead plate, about three-quarters of an inch in its short diameter, and one and one-half inches in its long diameter, with round edges and of a double elliptical shape. It can be made by any surgeon in five minutes. Or, if not convenient to make, a pearl button one inch in diameter will answer the purpose.

The silver-wire sutures should remain, if all goes well, from ten to twelve days. If other material than catgut is used for the remaining suture, they can be removed in eight

to twelve days. The bowels should be moved on the second day and on each day thereafter, and the stools must always be kept soft until after the tenth day. The diet should be nourishing, consisting of broths, soups and meats, soft-boiled eggs, baked fruits, well masticated. We have often in the past erred in feeding our patients too sparingly of blood-making foods.

Fig. 4.



Final appearance when all sutures are fastened.

In conclusion, I will say that I believe that this operation, as here described, can be made quite plain to the student, can be safely and quickly done; that the success will be as perfect a success as is possible by any method, and that the failures will be less frequent, and when they occur the parts will be in no worse condition for a future operation.

DISCUSSION.

Dr. Howard A. Kelly, of Baltimore.—I would like to hear from Dr. Dudley, of Chicago, whose wonderful work in plastic surgery is so well known.

Dr. E. C. Dudley, of Chicago.—I have seen this operation by Tait, and the characteristic routine speed with which he performs it. I have tried the operation and invariably succeeded in getting union. In two cases, however, a little pus formed back in the deepest part of the wound, resulting in each case in a small fistula-in-ano which gave some annoyance and impaired to a slight degree, although not completely, the result.

I do not often do this operation now, for the reason that it does not seem to me in the majority of cases to bring together the parts which have been torn apart; that is, it is not a restorative operation, but rather a substitute for an operation which might restore.

May I say a word in regard to perineorrhaphy in general, and especially in regard to the large number of operations which have been devised? If a thoroughly scientific and satisfactory article were to be written on the subject of perineorrhaphy, it would not be an article describing these various procedures, but it would treat, in a general way, of operating in such a manner as to restore the parts to the condition in which they were before they were torn. The first step must be to find the landmarks, and Emmet has told us how to do this by bringing together the lowest caruncula myrtiformis on either side with tenacula; when this is done we can discern the directions of the original rent and the cicatrices. On the correct observation of this landmark will depend the method by which we must proceed to restore the perineal body, so as to leave the vaginal outlet with an annular hymen. I think the failure to study these cases with the remains of the hymen as a guide accounts for the numerous methods of perineorrhaphy. I allow the bowels to be confined only for a short time even in complete lacerations. The feces should not have time to become hard. At the end of thirty-six to forty-eight hours, I give a cathartic, and before movement an enema of water. In this way the stools are kept soft until union is completed.

For an operation for laceration involving the sphincter no method can be laid down as applicable in every case. In a general way I would first close the rectal side of the rent with catgut sutures and then after noting the direction of the tear I would close it with silkworm-gut sutures close together and rather deep. First restore the rectal side of the rent and thereby reduce the case to one of incomplete laceration, to be treated as such. The entire restoration of the sphincter ani muscles and perineum should be done at one operation. A single word in regard to this perineal body, although not strictly in the line of the paper. The size of the perineal body has very little to do with its efficacy. There may be a small perineal body, but the perineum being well up under the pubes, close to the anterior wall of the vagina, no harm results; on the other hand, a very large perineal body not torn, but in complete subinvolution, relaxed, and occupying a location down toward the coccyx, may give no support for the anterior vaginal wall, but will produce all the evils of a lacerated perineum. Therefore it is not so much the question of size of the perineal body as its location—it must be well up under the pubes; but if it be ever so large and is located down toward the tip of the coccyx, and relaxed, it will not perform its functions, and an operation for contraction of the vaginal outlet is quite as important as if it had been extensively torn.

Dr. William M. Polk, of New York.—The last remark ot Dr. Dudley covers the ground exactly. The whole subject turns on the levator ani muscles, not the perineal body at all, and upon those portions of the muscles which correspond to the sling, so to speak, of the prostate in the male—those fibres which pass from the body of the pubic bone backward and meet each other at the side of the rectum in front of and behind it; if these are taut and in good condition, not in a state of relaxation and subinvolution, they drag forward or rather hold forward the tissues in the position mentioned, that is, well up toward the pubic bone, pulling the posterior wall of the vagina forward and of necessity supporting the weight of the pelvic organs.

Dr. Dudley.—In operating for lacerated perineum it has been my custom for the past five years to introduce each suture and tie it before inserting the next, instead of introducing all the sutures and then tying them, as is usually done. The reason

for this is that the sutures are less likely to antagonize one another if introduced and tied one by one.

But after a suture has been tied and the ends cut off, the free ends are apt to turn back into the wound and be in the operator's way. In order to get them out of the way, I fell into the habit, as soon as the suture was tied, of catching it with a Pean's forceps, of cutting off the superfluous part, and of then placing the forceps in the hand of an assistant who should hold the suture out of the wound. I soon discovered this to be an exceedingly valuable feature of the operation for an additional reason which I shall presently indicate.

In Emmet's operation for perineorrhaphy, let the first suture be introduced and tied in the angle of the sulcus on one side. Then clamp that suture with forceps, by means of which an assistant shall make firm traction toward the pubes while the next suture is being placed and tied. Then drop the first suture, seize the second in the forceps, and introduce the third precisely as the second was introduced, and so on until the requisite number have been inserted, and tied one by one on that side. Repeat this in the opposite sulcus.

Then introduce a suture through the lowest caruncle on the left side, carry it around, buried all the way, out through the lowest caruncle on the opposite side. This suture when tied will bring the lowest two caruncles and the crest of the rectocele together and will completely restore the remains of the hymen to its normal annular form. Let this suture be seized with the forceps as before, and the uterine portion of the wound may be closed in the same way in which the sulci were closed—that is, while each suture is being introduced and tied, firm traction should be made upward, in the direction of the pubes, on the preceding suture.

If the perineum is closed in this way it is surprising to see how it has been brought up so as fairly to hug the pubes. Indeed, the posterior part of the vaginal outlet will almost exert pressure upon the neck of the bladder and the pubes.

By this method the operator will never fail to get the perineum into its normal position.

THE RESEMBLANCE OF SOME FORMS OF BENIGN DISEASE TO MALIGNANT.

By Edward W. Jenks, M.D.,
Detroit.

At the meeting of the Michigan State Medical Society, in June last, I read a short clinical paper on a similar subject. In the brief article I present to you to-day I purpose following the same general line of thought. I offer this subject with the hope that it may elicit some discussion upon a topic of great interest not alone to the gynecologist, but to the general practitioner. The utterances of this Society are, to quite an extent, considered as authoritative, and, therefore, a discussion by its Fellows upon a gynecological subject exerts a wide influence.

With the advance of science, the growth of specialties, the increased facilities of schools and hospitals, a knowledge of clinical and pathological differences between benign and malignant disease has been more widely disseminated than formerly, and ordinary cases of either class are not often mistaken. There still remain, however, many extraordinary cases which tax the skill of the acutest diagnosticians. Sometimes benign disease is found masquerading in the symptoms of malignancy; and again, like a wolf in sheep's clothing, malignancy puts on the disguise of the benign.

If it is a serious thing to operate upon a malignant growth supposing it benign, bringing no alleviation to the patient and disappointment to the surgeon, what a grievous thing it is to find, when too late, that an apparently malignant dis-

ease would have been amenable to treatment and that that treatment has not been employed. Anæmia, exhaustion from pressure, and septicæmia, in cases of benign tumors have had their victims as well as carcinoma.

Case I. *Septicæmia and Supposed Cancer of the Uterus.*—The following case is quite a unique one, as a relation of its peculiarities will, in my opinion, demonstrate. There is one point of some interest to myself, at least, to which I desire to allude, namely, the physician by whom I was called to visit this patient was a well-known general practitioner with a large and varied experience, who was openly a bitter opponent to specialism in any branch of medicine or surgery. He informed me that the patient he wished me to visit had been exclusively under his care for many years, but now she was "very feeble in consequence of cancer of the uterus; there could be no doubt about the character of her disease, and the diagnosis was easy enough," but he questioned the propriety of doing anything beyond making her as comfortable as possible during the short time she might live.

The patient, who was in her sixtieth year, had lately grown rapidly feeble, and at the time of my visit showed unmistakable signs of septicæmia. An odor of putrefaction pervaded not her room alone, but the entire house. On making a digital vaginal examination I felt a very peculiar substance which seemed to be grasped by the upper portion of the vagina and there retained. I was unable to detach or remove any part of this mass with my finger, but after the insertion of the speculum I tore off a portion with the dressing-forceps which proved to be a piece of sponge, and by further efforts of the same kind succeeded in removing in pieces quite a large sponge. A considerable surface of the sponge had become adherent—a veritable case of sponge-grafting. It had been the habit of the physician to introduce a sponge in the patient's vagina for a pessary, as she had prolapsus uteri. He informed me that he considered this the best form of vaginal pessary. He said, however, that the time of inserting the last one had been over two years before. As the patient speedily regained her health it was ascertained that the sponge placed in the vagina two years before had been forgotten by both physi-

cian and patient, and was the cause of all the discomfort and stench to which the patient and her household had been for some subjected.

I was much surprised afterward to learn that neither the patient nor her friends were aware of the character of the substance that was removed, but believed that a rare and difficult surgical operation had been performed by means of which her life had been saved.

I have met during my professional life a number of benign growths of the uterus which have been previously pronounced malignant, but I will relate only two cases and of these it can be said that sufficient time has elapsed since first coming under my observation to prove their benign character.

Case II. *Sloughing Myo-fibroma of the Cervix.*—Mrs. B., æt. fifty-two, a resident of Wisconsin, was referred to me as having uterine cancer. She was the mother of several children; had always been in good health until about two years prior to consulting me, at which time she began to have attacks of hemorrhage, which she thought might be due to change of life, although she had ceased to menstruate regularly, as she believed, at the age of forty-eight. When I first saw her the hemorrhages had ceased, but there remained an offensive, ichorous, vaginal discharge, which had excoriated the labia and external parts. A segment of the tumor was seen protruding which bled when touched, and otherwise presented some of the characteristics of malignant disease. On further examination I found this tumor to be continuous with the anterior lip of the uterus from which it originated, and that the offensive discharge came from ulcerated patches of the tumor. The case was diagnosed as one of a benign rather than a malignant disease of the cervix uteri. With the scissors I removed the growth, which weighed, when drained of blood, a fraction less than two ounces, and proved by microscopic examination to be a myo-fibroma. Over five years have elapsed since this operation, and there has been no return of any form of the disease.

Case III. *Intra-uterine Fibroma.*—Mrs. R., æt. forty, of nervous temperament, married ten or twelve years, no children.

Two years before she had a tumor removed from the breast by a "cancer" doctor, which was said to be cancerous, thought there was no positive evidence in proof of the statement; therefore, when a growth appeared within the uterus it was feared that there was a return of the old disease with simply a change in locality. About a year from the time it was first noticed it had attained considerable size, and she suffered so much from pain that she was obliged to resort to opiates.

Although a woman of considerable character she was impulsive, and listened first to one and then another friend, each of whom had a different school or remedies, till "between the stool and the chair she was likely to come to the ground." Or, possibly, it was an instance where "De hoc multi multa, omnis aliquid, nemo satis." She had professional advice of the most varied character, that of regulars, homœopaths, and quacks. During one of the periods of regular rule her physician called me in consultation. On examination I found a large intra-uterine tumor attached by a broad base near the fundus. While fibroids may be more or less uneven it is rather a rounded unevenness than otherwise; but this tumor was nodular in some places, and this, together with the cachectic look of the patient, gave it a very suspicious character. In spite of damaging appearances I was not convinced that it was malignant, and advised its immediate removal. About a month later, she concluded to have this operation done, for which purpose the services of a homœopathic surgeon were engaged. The day before the operation her mind evidently became illuminated with the light of reason, for she suddenly changed her plans, sent for me, and desired me to perform the operation. This I consented to do only on condition that she should first have a consultation with two of her former physicians. This she obtained the same day; I operated the next day, and removed a tumor the size of a fœtal head at six months.

The facts of the patient being a nullipara, and of the high attachment of the tumor, introduced some difficulties. The pedicle could only be reached with the scissors by first cutting through the growth. Microscopical examination showed a few spindle-shaped cells, which, in spite of the hopeful prognosis

from a clinical standpoint, led me to pronounce a guarded opinion as to the prospects of the return of the disease. Three months later I saw her in good health, looking the best, she said, she had had in several years. She is not now a resident of Detroit, but I have heard of her since as leading an active life, busy in social and other matters as becomes a brilliant woman, the wife of a prominent man in one of the learned professions.

It has been my privilege to observe a number of ovarian tumors which possessed certain characteristics supposed to belong to uterine tumors, the most notable one of which has been uterine hemorrhage. In some instances these tumors have been looked upon by others beside myself as malignant in character. I will merely observe that in every instance coming under my notice of uterine hemorrhage in connection with ovarian tumors their pedicles have been short, fleshy, and very vascular. As this paper is designed to be a purely clinical one there will be no indulgence on my part in discussions of pathological or other theories. Among these cases I have selected only three.

Case IV. *Ovarian Cyst.*—Mrs. K., æt. forty, multipara. When I first saw her the abdomen was distended with what appeared to be a cyst with adhesions. The abdomen was tender, her temperature 99° to 100°, and there had been occasional hemorrhages from the uterus, several of which were profuse. A digital examination per vaginam would cause at any time more or less discharge of blood. The uterus seemed quite fixed by adhesions or exudations. The cervix uteri had been quite extensively lacerated in childbirth, and there being considerable ectropion and vascularity it could be easily made to bleed.

I decided, however, to perform laparotomy, and according to my own rule of practice, as every operation in the outset is exploratory, I left it until the abdomen was open before deciding just what the operation should be. Every antiseptic precaution was made use of. The peritoneum being reached, it was found in a state of subacute inflammation, extremely vascular, and with many adhesions in front. Further exploration revealed an

ordinary ovarian cyst of the left ovary, with adhesions to the omentum, abdominal walls, uterus, and intestines. The most serious of them were those to the omentum and abdominal walls, requiring several ligatures to the former. Heat and extensive compression with sponges failing to stop the continued oozing from the abdominal walls, I was obliged to resort to an heroic measure. This was to introduce through the abdominal walls, including the bleeding peritoneum, a long stitch on either side, parallel to and about four inches from the incision. A Peaslee needle and heavy braided silk were used, and the point of ingress and egress were six to eight inches apart before tying. This puckering of the abdominal walls made ample compression upon the bleeding peritoneum and with good results. The stitches were removed at the end of twenty-four hours. The patient made a rapid recovery, with not a single untoward symptom, unless I should mention the great depression she suffered upon the third day; it was not depression of temperature, however, but of mind, on account of not being allowed to gratify an unquenchable desire for a plate of beefsteak garnished with onions and accompanied by saurkraut.

It falls to the lot of all to encounter forms of disease so ill-defined in character that it is difficult and often impossible to decide under what category to place them. After all resources of diagnosis have been exhausted there is still an uncertainty which causes one to pause a moment before determining his course of action. In these periods of mental debate in which there are as many *pros* as *cons* in regard to surgical interference, what is it that settles the question in the affirmative? Usually it is that idea deeply rooted in the mind of every right-thinking surgeon, to give a patient the best chance for life. This is, or should be, the strongest tenet in the surgical creed. Everyone believes in it, but every man must confess to himself—if to no other—that some time in his life he has lacked the insight or the courage to put it in action.

Sometimes the decision is made by what might be called a

surgical optimism—that is to say, sanguine convictions concerning the powers of nature and the benefits of surgery.

Certain surgical experiences give a turn sometimes to the decisions of even the most exact, logical, and scientific minds, and no hard and fast rules can be laid down for such conclusions.

Case V. *Ovarian Cyst.*—In July, 1887, an unmarried lady of about thirty-five was referred to me as a case for hysterectomy. She had previously consulted two well-known surgeons, experienced in abdominal surgery, with each of whom I conversed concerning the case; one unhesitatingly said that it was a case of cancerous disease involving the uterus, the only remedy hysterectomy, and that unjustifiable, therefore he emphatically refused to make even an exploratory operation; the other gentleman was less positive concerning the character of the disease, and the surgical procedure to be adopted. The symptoms which led to the above conclusions were as follows:

She was very spare, and had the aspect which is sometimes seen with malignant disease; the cervix uteri was large and somewhat irregular in shape, extremely vascular and bled when touched, there were also occasional uterine hemorrhages, but not profuse. There was the evidence of a large abdominal tumor, which had attained its present size in only two months. When I saw her it could not be distinctly felt, as the abdominal walls were extremely tense from ascites, intestinal tympanites, and the tumor. I prescribed ox-gall and ginger for the tympanites, which afforded her great relief from the extreme pressure. I next saw her ten days after, when, from the disappearance of the intestinal tympanites, I was able to make out the perfect outline of the tumor, which I then concluded was an ovarian cyst. The operation was performed the following day. Upon opening the abdomen considerable ascitic fluid was found, probably a gallon in quantity, which must have been caused principally by pressure, as there was but slight evidence of inflammation. This was in front chiefly, as was shown by the adhesions. The tumor was a multilocular cyst of the right ovary, with an extremely thick and vascular pedicle. The patient made a speedy recovery. The

cervix uteri, which had been previously designated as unmistakably cancerous, was not interfered with.

The patient married last year and became pregnant, but through an accident aborted at the fourth month.

Case VI. *Ovarian Cyst.*—Mrs. D., multipara, first consulted me in the early part of 1886. She was then fifty-six years of age. About three years prior to her consulting me she suffered from severe abdominal pain, with occasional attacks of metrorrhagia. She supposed that this was due to change of life, although she was not able, owing to various symptoms, to say whether she had passed the climacteric period or not. Coincident with the above-named symptoms she noticed the abdomen begin to enlarge. Her appearance when I first saw her was indicative of malignant rather than benign disease. She was sallow and extremely emaciated, with a pinched and anxious expression of countenance. On making physical examination I found the uterus immovable with what seemed to be a large and nodular tumor, filling the pelvis and extending upward, midway between the pubes and the umbilicus. The neck of the uterus was nodular, ragged, and granulated. It would easily bleed when touched, and a protracted examination would cause a considerable flow of blood. I was unable to discover the existence of a cyst, although I made a thorough, careful examination, including one per rectum. The general appearance of the patient, the history of the case as related to me, the nodular tumor, the immobility of the uterus, the condition of the neck of the womb, the uterine hemorrhages, and the age of the patient, all combined, led me, without any mental reservation, to adopt the opinion that the tumor was uterine and malignant in character. This opinion was rendered more warrantable as there was no obtainable history of any attacks of pelvic inflammation. Nor was I alone in my convictions, as the patient had previously consulted several well-known gynecologists in other cities, who had expressed the same views. To the patient, herself, following my usual custom, I said nothing about the possibility of cancer, but I had no hesitation in frankly telling her family my conclusions. I was surprised when she decided to remain in Detroit and place herself in my care for treatment, as there

seemed to my mind but little need of continuous medical attention. She entered the Sanitarium, and during the three months she remained there I made repeated examinations, none of which caused me to change my opinion, that the abdominopelvic tumor was cancerous in character, and there need be no expectation of surgical interference. As I had not encouraged the patient remaining under constant medical supervision, she visited friends in other cities. When I saw her again in July, 1887, she was suffering from pelvic peritonitis, and I feared it would become general, but happily it did not. The abdomen was much larger than I had ever seen it before, and appeared to contain a quantity of ascitic fluid. Owing to the excessive tenderness, I made no attempt at a thorough examination, nor did I then deem it necessary, as I still held to my formerly-expressed belief regarding the character of the tumor. From subsequent developments I learned that the supposed ascites was due to a ruptured cyst.

I next saw the patient in October, 1887, when she had become a resident in Detroit. The change which had taken place in her condition was to me astonishing. The abdomen was distended with a large cyst; there was no nodular or fixed portion to be felt per vaginam. There was no menorrhagia; the cervix uteri was not granulated and did not bleed even when roughly handled; the uterus was movable, and at this time I had no hesitancy in declaring the tumor to be ovarian.

After October, 1887, until the close of the year, I saw and examined this case from time to time. As the cyst enlarged, indications of pelvic inflammation disappeared, and an examination per vaginam, presented as marked a contrast to the condition of the pelvic organs when I first saw her, as if there had been two distinct individuals; one with a malignant tumor of the uterus or ovary, with all the organs matted together, and another with an ordinary multilocular cyst of the ovary with some adhesions.

The patient was averse to an operation, although she was urged to submit to one before her system had become too much enfeebled by reason of the tumor's development. Everything was done for her comfort that a devoted family could do. She wished to attend to certain social and business affairs before she would con-

sent to an operation, and her friends, under the circumstances, were very reluctant in urging her to this procedure. Her health began to break, the abdomen was fast increasing in size, and she rapidly emaciated. Her breathing became labored, and altogether it seemed that she would soon succumb to the disease, but she determinedly postponed the operation until all her affairs were in order, when she appointed the day. The patient was now fifty-seven years of age. Her general appearance indicated extreme feebleness, and I have never, to my recollection, made any kind of a surgical operation upon a patient so devoid of fat as was this one. The absence of adipose tissue in surgical operations of so serious a nature as the extirpation of an ovarian tumor has an important bearing on ultimate recovery. A fair quantity of fat is like a storehouse of strength, the reserve forces nature had provided for sustaining one during lessened assimilation of nourishment.

At the time of operating the ovarian tumor was between three and four years old. The first rupture of one of its cysts had occurred over two years before, and there had been repeated attacks of localized peritonitis. As is usual in ovarian tumors of long standing, the tissues were easily torn, causing the cyst to be ruptured unavoidably, thereby complicating and rendering tedious the various steps in the operation. As a whole, the operation can be designated difficult, and there was considerable loss of blood from the adhesions, which were numerous. It was a large multilocular tumor, involving the right ovary and broad ligament. The pedicle was thick and vascular. There were also many ligatures of silk applied to the bleeding points, of which no account in numbers was taken. The operation was as thoroughly aseptic in every detail as it could be. Better assistants could not be found. Each and every one had assisted me in many laparotomies and various operations in gynecological surgery. Assistants often contribute to the success of laparotomies, as well as the failures, although the principal is the only one responsible. I have digressed from the main subject to emphasize the advantages of having in this class of operations, tried assistants, familiar with every motion of the operator and every step in the operation; as such they seem capable of anticipating every wish of the prin-

cipal, and as surgical mind-readers, so to speak, greatly aid toward successful results.

But to resume our subject: The patient rallied from the operation better than was expected. A careful record of the case shows that everything progressed favorably. The bowels moved spontaneously after the fourth day, digestion seemed to be fair, temperature became normal after the first week, and there appeared to be a good chance for her recovery, judging from symptoms.

There seemed to be toward the close of the third week after the operation an intimation of some lack of strength, and yet all interested in the case considered her almost convalescent. This loss of strength was almost imperceptible from day to day, and could only be comprehended by a review of two or three days. When the fourth week was reached there began a more rapid decline, and with its conclusion she succumbed. A post-mortem examination failed to discover any causes of death. The pedicle and other localities having ligatures showed them encysted, and all parts in the best possible condition. The cause of death was doubtless asthenia, but back of this the cause was due to almost entire absence of fat as a means of nourishing and sustaining her.

In conclusion, I desire to direct attention to the misguiding symptom which led to the belief of the existence of malignant disease. These symptoms were in consequence of pelvic inflammation, and the same cause was also acting in some degree in each case of ovarian tumor I have referred to. One of the common symptoms of the presence of subacute and a preceding acute circum-uterine inflammation, is menorrhagia, although this is not infrequently small in quantity. This in connection with an immovable and a granular, vascular, and easily-bleeding neck, contributes to the formation of a group of misleading symptoms of which that best of all teachers, clinical experience, cannot always enable one to judge rightly.

DISCUSSION.

Dr. William M. Polk, of New York (in the Chair).—This paper, which opens up the subject of the differentiation of the dividing line between carcinoma and benign disease, is before you.

I will simply call your attention to the two prominent points in the paper. In the first place, the class of cases included under the head of ovarian, which would seem to indicate the propriety of an exploratory incision as a means of diagnosis; and the other class of cases which are represented by intra-uterine disease and hemorrhage, in which we are called to decide upon the question of carcinoma with a view of determining vaginal hysterectomy, or some such operative procedure.

Dr. A. Palmer Dudley, of New York.—I will say that I have had some experience with this form of disease, and I appreciate the value of Dr. Jenks's paper. The first ovarian operation that I ever performed—the first laparotomy—was in Boston, and I had some of the best men in Boston as consultants. It was utterly impossible for us to make a diagnosis as to whether this growth was malignant or benign, or in fact to tell just what it was, although it had been two or three years in developing. The operation was performed, and the tumor presented the appearance at the time of being a benign growth. There were no adhesions whatever, the pedicle was a very long and small, so that one ligature of catgut was sufficient. In five months' the woman died of sarcoma on the opposite side. The disease sprung from the pelvic floor behind the uterus. At the time of the operation I took great care not to let any of the contents of the sac escape into the abdominal cavity, but one of the cysts, of which the growth was made up, burst under my fingers and a quantity of fluid made its way into the abdomen, and the only reason I could give for the return of this malignant disease was that the contents of the tumor, which presented every appearance of a benign growth, did contain cells of a semi-malignant character which, when allowed to remain in contact with the freshly-congested peritoneum, grafted themselves upon it, and

from that sprang the second sarcomatous growth behind the uterus.

There is one point which will help us to distinguish intra-abdominal tumors, benign or malignant. The malignant almost always give a history of rapid growth associated with ascites; when you have a patient near to or past the menopause who is developing an abdominal tumor, and the growth is rapid, or within a period of six months accompanied with ascites, I always fortify my own position as much as I can by saying to my patient that this growth presents the appearance of being malignant disease, and that I have seen many cases of mistaken diagnosis confirmed by the abdominal section. Cases of apparently malignant disease within the uterus that may be benign have been demonstrated very thoroughly in my experience by two cases. One patient was the wife of a clergyman and the mother of twelve children, who had been treated a long time for cancer of the uterus. She was given up to die, and would have died within a month or so from septicæmia. Examination of this patient when she came into my hands revealed every evidence of malignant disease of the cervix, but a still more careful examination showed it to be an intra-uterine growth that had been expressed into the cervix and had become necrotic in consequence of the pressure; the cervix grasped this growth very closely in the middle portion of it, and the attending physicians had failed to pass their fingers between it and the cervical canal, or dilated cervix. The tumor proved to be simply a pediculated fibroid which had been expressed from the body of the uterus and compressed to such an extent that portions of it had necrosed, and from this sloughing fibroid the woman had septicæmia which nearly resulted in her death. The removal of the fibroid corrected the condition, and the patient is now one of the most healthy women in our city. So it is an easy matter to mistake benign for malignant growths, unless we are very careful in our physical examination.

Dr. Mynter, of Buffalo.—I would like to recite one case that may be of interest to the Society. Some eight years ago I was consulted by a woman about forty-five or fifty years of age who had a tumor in the abdomen which was difficult to diagnose.

There was evidently some ascites present, the tumor growing slowly, and she was not emaciated, and there was no appearance of anything that would indicate a malignant tumor. I looked upon it not as being ovarian in nature, but rather a fibro-cystic tumor of the womb. I did not want to make an abdominal hysterectomy, and happening to meet Dr. James P. White, who was once a Fellow of this Society, I asked him if he would like to make a hysterectomy. He went with me and examined the patient carefully and came to the same conclusion—that it was a benign fibro-cystic tumor of the womb, and that hysterectomy was indicated. Under the best conditions possible, the house being a small one, and a number of Buffalo physicians being present, we attempted to remove the tumor. In less time, almost, than it takes to relate this Dr. White had opened the abdominal cavity and removed an immense tumor, which looked like anything else than a fibro-cyst until I stopped him and told him I thought he had a cancer of the omentum. By this time he had torn out over a yard of the transverse colon, with an immense amount of cancer which had evidently started in the omentum itself. He closed the wound and tried to confine the torn bowels, but the woman died a few minutes afterward.

I mention that to show that even the older members in the profession, having a large experience, can make those mistakes. I was very much pleased that I kept my hands off the patient on that occasion.

Dr. Jenks.—It is so late now, Mr. President, and there are so many other papers to be read, that I will say nothing more at this time.

MEASUREMENTS OF THE UTERINE CAVITY IN CHILDBED.

By Wm. L. Richardson and A. D. Sinclair.
Boston.

At the annual meeting in September, 1879, statistics of measurements of the uterine cavity in childbed in 108 cases, were communicated to the Society; in 1881, two more series of 108 cases each; and again, in 1882, two series of 108 cases each were presented to and published in the *Transactions* of the Society, *vide* vols. iv., vi., and vii.

We now present tables of five series more of 108 cases each, which, with those already reported, make a total of 1080 observations made at the Boston Lying-in Hospital. The tables and analyses of these last series are to a great extent the work of the house physicians, Drs. W. E. Fay and A. P. Chadbourne.

The following summary of the results obtained in the series previously reported to the Society, and the present series, may be of interest:

1. Average age of the 1080 cases 23.55 years.
2. " " " 746 primiparæ, 22.11 years.
3. " " " 334 multiparæ, 26.53 "
4. Average number of days in childbed when uterine cavity was measured, 16.32.

5. The uterine cavity measured:

Inches.	Primiparæ.	Multiparæ.	Inches.	Primiparæ.	Multiparæ.
1¾	1	—	3½	74	44
2	8	5	3⅝	11	5
2⅛	1	—	3¾	83	40
2¼	28	3	3⅞	7	4
2⅜	—	1	4	66	34
2½	70	23	4⅛	9	5
2⅝	6	2	4¼	26	14
2¾	95	42	4⅜	4	3
2⅞	1	—	4½	25	2
3	126	56	4⅝	—	2
3⅛	10	3	4¾	1	2
3¼	85	42	4⅞	1	—
3⅓	8	—	5	3	—
3⅜	3	1	5¼	1	—

6. Average day on which the measurements were made:

Inches.	Day.	Primip.	Multip.	Inches.	Day.	Primip.	Multip.
1¾	15	15	....	3½	17.11	16.89	15.91
2	15.23	14.25	16.80	3⅝	14.23	14	17.75
2⅛	19	19	....	3¾	16.49	17.42	15.31
2¼	15.17	15.96	14.33	3⅞	38.62	45.40	36
2⅜	28	....	28	4	17.11	18.20	14.81
2½	16.19	16.94	14.12	4⅛	16.85	17.19	34
2⅝	18.93	20.25	14	4¼	15.06	15.68	14.14
2¾	15.89	16.55	14.11	4⅜	46.33	42.50	35.50
2⅞	13	13	....	4½	14.96	15.22	14
3	17.46	18.46	15.64	4⅝	14	.....	14
3⅛	23.83	23.75	24.25	4¾	18.75	13	24.50
3¼	17.43	18.40	14.96	4⅞	12	12	.....
3⅓	21	21	....	5	14.50	14.50	.....
3⅜	17.25	17.66	14	5¼	13	13	.....

7. Average length of uterine cavity in 1080 cases, 3.25 inches.
" " " 745 primi. 3.27 "
" " " 335 mult. 3.29 "

No.	Primipara or Multipara.	Age	Duration of labor. First stage. h.	m.	Second stage. h.	m.	Day of measurement.	Length of uterine cavity in inches.	Position of uterus at time of measurement.	Post-partum condition. Remarks.
1	Primipara.	27	9	15	1	10	18	4	Retroversion.	
2	"	23	12	35	1	47	14	3½	Normal.	Perineum torn.
3	"	26	11	15	...	30	13	3½	Retroversion.	" "
4	"	21	4	15	...	25	13	3½	Anteversion.	
5	"	17	5	15	1	20	12	4½	Normal.	Septicæmia.
6	"	20	...	40	1	45	15	3⅞	"	Galactorrhœa.
7	"	21	6	40	8	10	37	2½	"	Post-partum hemorrhage; septicæmia.
8	"	22	2	55	...	27	15	4	"	
9	"	19	14	...	...	18	14	4½	R. lateral vers'n.	
10	"	19	22	25	...	15	23	4½	Normal.	Perineum torn.
11	"	24	9	25	...	20	12	4½	"	
12	"	19	9	05	...	50	17	4	"	Cervix slightly lacerated.
13	"	19	44	...	1	25	14	4¼	"	" " "
14	"	19	13	45	1	...	13	3¾	R. lateral vers'n.	
15	"	26	10	45	...	15	11	4¼	Normal.	
16	"	23	14	30	7	...	11	4¼	Anteversion.	Perineum torn; cystitis.
17	"	24	51	30	1	05	16	4½	Normal.	Face presentation.
18	"	28	13	...	1	03	15	3¼	Antetlexion.	
19	"	18	5	20	...	30	14	3¾	Anteversion.	
20	"	17	15	...	2	03	14	3¾	Normal.	
21	"	25	12	20	2	20	21	3½	"	Endocervicitis.
22	"	22	15	15	...	55	17	3¾	"	
23	"	19	13	40	1	...	15	3½	"	
24	"	20	9	30	3	13	17	2⅞	L. lateral vers'n.	Cervix lacerated.
25	"	33	29	05	1	15	15	3	Normal.	
26	"	21	5	15	...	25	16	3	Anteversion.	
27	"	21	14	...	1	45	20	3½	Normal.	
28	"	24	5	40	...	12	41	2¼	"	Endocervicitis.
29	"	19	3	15	1	15	28	2½	"	Slight tear of perineum and cervix.
30	"	16	10	50	3	35	23	2¾	"	Perineum slightly torn
31	"	23	8	30	3	59	15	2½	Right lateral retroversion	
32	"	21	31	05	1	26	15	2¾	Normal.	
33	"	22	20	40	...	50	13	4½	R. lateral vers'n	
34	"	21	10	43	...	24	30	3½	Anteversion.	Septicæmia.
35	"	24	10	05	...	30	17	4½	L. lateral vers'n	
36	"	23	3	35	1	26	17	4½	Retroversion.	
37	"	19	28	30	1	06	23	2⅝	Normal.	Septicæmia; perineum torn.
38	"	19	24	10	...	27	34	3¼	Anteversion.	" " "
39	"	18	16	30	1	15	29	3¾	Normal.	Septicæmia.
40	"	19	8	45	1	58	19	3¾	Anteversion.	
41	"	24	12	20	...	30	19	2¼	R. lateral vers'n	Septicæmia.
42	"	18	6	...	7	05	17	3	Anteversion.	Perineum torn.
43	"	25	6	...	...	35	20	3½	"	Breech; forceps; perineum torn.
44	"	21	28	50	17	10	21	3½	"	Perineum torn.
45	"	26	42	15	...	52	19	4	"	Perineum torn; hydramnios; septicæmia.
46	"	22	7	...	...	30	26	2¼	"	Septicæmia.
47	"	25	7	30	...	05	12	2½	"	Breech; nephritis.
48	"	22	6	30	3	30	24	2½	"	Septicæmia.
49	"	23	31	...	2	45	19	3¾	"	Perineum torn; monster; septicæmia.
50	"	20	8	40	...	40	10	4½	"	Septicæmia; perineum torn.
51	"	20	9	50	3	25	23	2¼	"	Septicæmia.
52	"	20	41	25	...	58	14	2¾	Normal.	Perineum slightly torn.
53	"	22	11	40	3	05	19	3½	"	Septicæmia; perineum torn.

No.	Primipara or Multipara.	Age	Duration of labor. First stage. h.	m.	Second stage. h.	m.	Day of measurement.	Length of uterine cavity in inches.	Position of uterus at time of measurement.	Post-partum condition. Remarks.
54	Primipara.	19	5	05	1	20	24	2¼	Normal.	Septicæmia.
55	"	21	6	30	1	...	15	3½	"	"
56	"	18	12	...	...	38	27	3¼	"	Post-partum hemorrhage; septicæmia; perineum torn.
57	"	24	10	20	1	05	15	2¾	"	Septicæmia.
58	"	25	26	08	...	02	22	2¼	Slight anteversion.	Septicæmia; perineum torn.
59	"	22	12	...	2	45	20	2¾	Normal.	" " "
60	"	18	4	30	...	45	12	2¼	"	
61	"	22	28	34	2	50	12	3¼	"	
62	"	20	4	50	...	20	12	3¾	"	
63	"	26	4	...	2	20	10	2¼	"	
64	"	19	4	40	...	45	27	3¼	"	Septicæmia.
65	"	25	6	50	...	55	15	3¾	Retroversion.	
66	"	32	14	30	5	...	20	2¼	Anteversion.	Septicæmia.
67	"	21	5	...	...	45	13	3	Retroversion.	
68	"	20	24	15	2	15	18	3¾	Normal.	Septicæmia.
69	"	24	7	...	...	55	11	4	"	Forceps.
70	"	23	5	40	3	28	21	3¼	"	Forceps; perineum torn.
71	"	22	7	...	1	20	15	2½	"	Perineum torn.
72	"	17	18	...	1	...	16	2¾	"	Perineum torn; septicæmia.
73	"	22	39	25	2	40	23	3¼	"	" " "
74	Multipara.	32	5	45	?		13	3½	L. lateral vers'n	
75	"	32	2	40	...	10	12	3	Normal.	Perineum torn.
76	"	22	41	42	...	16	18	3½	"	
77	"	18	6	...	...	40	13	4	Anteversion.	
78	"	22	3	35	...	25	13	4	Normal.	
79	"	20	5	45	...	45	13	4	"	
80	"	27	15	...	...	10	11	4	"	Cervix lacerated.
81	"	34	46	40	...	15	13	4	"	
82	"	35	20	40	?		13	4	"	
83	"	32	12	10	...	20	12	3¾	"	Cystitis.
84	"	25	5	35	...	17	16	3½	Anteversion.	
85	"	33	8	...	...	50	14	4	Normal.	
86	"	28	33	30	...	03	14	4	"	
87	"	27	2	40	2	05	11	4¼	"	Twins; version second child.
88	"	31	7	05	...	20	13	4	"	
89	"	39	9	35	...	37	17	3¾	L. lateral vers'n	
90	"	22	6	40	...	05	20	3⅝	R. lateral vers'n	
91	"	27	6	10	1	30	15	3	Slight retroversion.	
92	"	21	11	40	3	20	18	2¾	Normal.	Perineum torn.
93	"	29	14	...	...	30	14	3¼	"	Perineum torn; cervix lacerated.
94	"	28	6	15	1	15	13	2¾	"	
95	"	30	4	43	1	12	31	3	Slight anteversion.	Septicæmia.
96	"	26	4	35	...	02	26	4	Normal.	
97	"	27	11	55	...	10	14	2¾	Slight left lateral version.	
98	"	20	2	...	...	50	14	3	Normal.	
99	"	20	10	38	...	14	11	3¼	Slight anteversion	
100	"	31	3	30	...	15	16	3¾	Anteversion.	
101	"	37	6	30	...	50	12	4	Normal.	
102	"	24	7	...	...	05	19	3¾	Anteversion.	
103	"	32	8	30	...	08	20	3¾	"	
104	"	45	21	45	...	27	19	3¾	"	Hydramnios.
105	"	27	17	...	...	30	12	2½	L. lateral vers'n	
106	"	26	12	15	1	20	14	2¼	Normal.	
107	"	25	3	15	...	40	13	2¼	"	
108	"	26	2	15	...	15	14	2½	"	Septicæmia.

Analysis of the 108 cases gives the following results :

1. Average age of the 108 cases was 23.80 years.
2. " " 73 primiparæ was 21.80 "
3. " " 35 multiparæ was 28.00 "
4. Average number of days in childbed when uterine cavity was measured was 17.17 days.

		Primiparæ.	Multiparæ.
5. The uterine cavity measured	$2\frac{1}{4}$ inches in	10	1
" " "	$2\frac{1}{2}$ "	7	3
" " "	$2\frac{5}{8}$ "	1	....
" " "	$2\frac{3}{4}$ "	6	3
" " "	3 "	4	4
" " "	$3\frac{1}{4}$ "	6	2
" " "	$3\frac{1}{2}$ "	10	3
" " "	$3\frac{5}{8}$ "	1	1
" " "	$3\frac{3}{4}$ "	11	6
" " "	4 "	5	11
" " "	$4\frac{1}{4}$ "	3	1
" " "	$4\frac{1}{2}$ "	9	....

6. Average day on which the $2\frac{1}{4}$ inches measurements were made (24.4 primiparæ, 14 multiparæ) 20.72.
7. Average day on which the $2\frac{1}{2}$ inches measurements were made (20.8 primiparæ, 13 multiparæ) 18.46.
8. Average day on which the $2\frac{5}{8}$ inches measurements were made (23 primiparæ) 23.
9. Average day on which the $2\frac{3}{4}$ inches measurements were made (17.1 primiparæ, 15 multiparæ) 16.40.
10. Average day on which the 3 inches measurements were made (15.2 primiparæ, 18 multiparæ) 16.62.
11. Average day on which the $3\frac{1}{4}$ inches measurements were made (20.8 primiparæ, 12.5 multiparæ) 18.72.
12. Average day on which the $3\frac{1}{2}$ inches measurements were made (18.6 primiparæ, 15.6 multiparæ) 17.91.
13. Average day on which the $3\frac{5}{8}$ inches measurements were made (15 primiparæ, 20 multiparæ) 17.50.
14. Average day on which the $3\frac{3}{4}$ inches measurements were made (18.5 primiparæ, 17.1 multiparæ) 18.

15. Average day on which the 4 inches measurements were made (15.6 primiparæ, 14 multiparæ) 14.50.
16. Average day on which the 4¼ inches measurements were made (12 primiparæ, 14 multiparæ) 12.50.
17. Average day on which the 4½ inches measurements were made (14.88 primiparæ) 14.88.
18. Average length of the uterine cavity in 108 cases, 3.38 inches.
19. " " " " 73 primi. 3.34 "
20. " " " " 35 multi. 3.46 "
21. Average length of uterine cavity in 57 cases (33 primiparæ, 24 multiparæ) measured within 15 days, 3.42 inches. Average length of primiparæ, 3.45 inches; average length of multiparæ, 3.40 inches.
22. Average day on which the uterine cavity was measured in 22 cases of primiparæ, with more or less laceration of the perineum, 16.36. Average length of the uterine cavity, 3.45 inches.
23. Average day on which the uterine cavity was measured in 7 cases of multiparæ, with more or less laceration of the perineum, 15.57. Average length of the uterine cavity, 3.37 inches.
24. Average day on which the uterine cavity was measured in 6 cases of primiparæ, with more or less laceration of the perineum and cervix, 13.50. Average length of uterine cavity, 3.87 inches.
25. Average length of the first stage of labor in 72 cases of primiparæ, was 14 hours 17 minutes.
26. Average length of the first stage of labor in 35 cases of multiparæ, was 10 hours.
27. Average length of the second stage of labor in 72 cases of primiparæ, was 1 hour and 56 minutes.
28. Average length of the second stage of labor in 35 cases of multiparæ, was 1 hour and 8.31 minutes.

No.	Primipara or Multipara.	Age	Duration of labor. First stage. h.	m.	Second stage. h.	m.	Day of measurement	Length of uterine cavity in inches.	Position of uterus at time of measurement.	Post-partum condition. Remarks.
1	Primipara.	22	20	20	...	08	25	3¾	Slight retroversion.	Septicæmia.
2	"	20	66	20	2	05	22	3¼	Normal.	" perineum torn.
3	"	24	10	05	1	...	17	3¼	"	Cervex and perineum torn. [torn.
4	"	22	6	20	3	40	16	2¼	"	Septicæmia; perineum
5	"	23	27	30	...	40	14	2¼	"	" " "
6	"	25	3	30	1	...	22	3½	Slight retroversion.	" " "
7	"	22	36	20	2	35	20	3¾	Normal.	" " "
8	"	18	9	40	2	35	12	2¾	Slight lateral version.	
9	"	18	46	45	4	30	30	2¼	Normal.	Cervix and perineum lacerated; septicæmia
10	"	24	24	30	2	05	12	2½	"	Septicæmia; perineum
11	"	21	11	...	...	12	16	2½	Slight retroversion.	[torn.
12	"	27	56	50	5	35	17	2½	" "	Forceps; septicæmia.
13	"	22	15	10	...	30	13	2¼	Slight right lateral	Premature.
14	"	24	9	...	2	10	12	3¾	Normal. [version.	Septicæmia.
15	"	23	17	...	1	34	16	2¾	Anteversion.	Perineum torn.
16	"	21	4	15	1st 0 2d 0 3d 1	10 45 ...	15	2¾	Normal.	Triplets.
17	"	20	9	35	...	55	14	2¼	"	
18	"	26	8	...	...	54	12	2¾	"	
19	"	20	24	45	...	15	13	2¼	"	Septicæmia; perineum slightly torn.
20	"	24	15	30	...	45	10	2½	Slight anteversion.	Perineum slightly torn
21	"	24	53	...	...	20	13	2¼	Normal.	Perineum slightly torn dead fœtus; version.
22	"	27	7	30	...	30	10	3	"	Cervix lacerated.
23	"	21	9	...	...	42	15	2¾	"	Cervix lacerated.
24	"	19	4	15	...	45	28	3	Slight anteflexion.	Septicæmia.
25	"	18	18	45	1	...	14	2½	Normal.	
26	"	20	54	45	1	41	13	2¾	"	
27	"	19	36	30	1	25	14	2¾	Slight anteversion.	
28	"	20	10	15	...	45	15	3½	Lett lateral version.	
29	"	23	10	10	...	15	14	2½	Normal.	
30	"	20	51	15	...	20	12	2½	"	Dead fœtus.
31	"	22	88	58	...	05	15	3¼	"	Premature.
32	"	21	9	...	...	55	14	2¼	"	
33	"	19	27	30	1	35	14	3½	"	
34	"	16	16	40	3	...	14	2¼	Slight left version.	
35	"	20	15	35	...	55	10	2½	Normal.	
36	"	24	9	...	4	50	15	2½	"	
37	"	40	27	30	3	30	13	2¾	Retroversion.	Forceps.
38	"	21	8	20	...	10	13	3	Normal.	Endocervicitis.
39	"	20	16	...	2	45	14	3¾	"	
40	"	20	20	40	...	05	13	3¼	Slight lateral version	
41	"	22	39	15	1	...	14	3½	Normal.	
42	"	23	6	...	6	...	15	3¼	"	
43	"	20	10	45	...	40	12	2¾	"	
44	"	24	8	30	1	45	13	2¼	"	
45	"	26	19	45	3	18	23	3	Slight anteversion.	
46	"	20	13	...	...	30	13	3⅝	Normal.	
47	"	17	24	...	...	30	15	4	"	
48	"	21	17	30	1	20	14	2½	"	
49	"	21	11	44	2	05	11	2½	"	
50	"	20	15	20	1	10	14	2¾	"	
51	"	18	33	20	1	05	13	2¾	"	
52	"	23	31	45	...	50	13	3½	"	
53	"	18	16	...	3	...	13	3	"	
54	"	20	20	45	1	25	12	2¾	"	

No.	Primipara or Multipara.	Age	Duration of labor. First stage. h.	m.	Second stage. h.	m.	Day of measurement.	Length of uterine cavity in inches.	Position of uterus at time of measurement.	Post-partum condition. Remarks.
55	Primipara.	21	3	25	...	25	14	2¾	Slight right lateral version.	Malaria.
56	"	27	24	45	2	40	15	3	Normal.	
57	"	18	19	45	...	55	14	3	"	
58	"	23	63	40	...	55	13	2½	"	
59	"	25	7	30	...	32	16	3	Slight anteversion	Slight tear of perineum
60	"	20	15	40	...	40	14	2¾	Normal	
61	"	24	7	...	...	50	15	2½	"	
62	"	25	5	10	1	15	14	3	"	
63	"	26	63	10	...	55	12	2½	Retroversion.	
64	"	36	12	40	2	50	14	3½	Normal.	
65	"	24	17	...	2	40	11	3¾	Slight right lateral version.	
66	"	27	16	05	1	05	14	3¾	Retroversion.	
67	"	29	17	...	...	45	17	2¾	Normal.	
68	"	25	18	...	...	13	13	2¾	"	
69	"	19	17	30	2	48	15	2¼	"	
70	"	23	42	30	...	45	14	2½	"	
71	"	21	12	15	...	05	16	3¾	"	Breech
72	"	18	20	25	...	17	15	3	"	Septicæmia.
73	"	23	14	45	4	10	10	2¾	Slight anteversion.	Forceps; septicæmia.
74	"	27	70	15	12	45	43	3¾	Anteflexion.	Forceps; perineum torn; breech; contracted pelvis.
75	Multipara.	27	17	40	...	15	14	3¼	Slight anteversion.	Septicæmia.
76	"	24	5	30	...	27	13	2¾	Normal.	Cervix lacerated.
77	"	25	3	50	...	05	12	3	"	Perineum torn.
78	"	30	27	30	...	45	15	3	Slight retroversion.	
79	"	27	18	25	...	30	17	2½	Normal.	Perineum torn.
80	"	27	7	30	...	15	10	2½	"	
81	"	21	8	10	...	13	11	2½	"	Cervix lacerated.
82	"	24	10	...	3	...	13	3½	"	Post-partum hemorrhage
83	"	22	22	...	...	05	13	2½	"	Septicæmia.
84	"	26	13	30	1	40	9	3	Slight retroversion.	
85	"	35	34	20	...	20	11	3½	Retroflexion.	
86	"	19	50	...	...	11	11	3¼	Slight left lateral version.	
87	"	20	6	05	...	25	13	2½	Normal.	
88	"	32	5	50	1	...	11	3½	Right lateral version	
89	"	40	11	05	...	45	11	3½	Normal.	
90	"	28	16	30	1	10	16	3½	"	
91	"	26	6	25	...	45	13	3	Slight retroversion.	
92	"	40	3	15	1	33	15	2¾	Slight anteversion.	
93	"	24	3	45	...	10	14	3	Normal.	
94	"	21	12	...	...	15	13	2¾	"	
95	"	27	13	30	1	20	12	3	"	Cervix lacerated; [perineum torn
96	"	22	3	10	...	25	14	2¼	"	
97	"	24	16	25	...	12	13	4	"	
98	"	24	6	40	...	58	13	2½	"	
99	"	37	18	30	...	30	17	3	"	
100	"	25	5	20	...	16	14	2½	Anteversion.	
101	"	29	7	45	...	20	13	3	Slight anteflexion.	
102	"	32	11	50	...	20	11	3	Normal.	
103	"	30	15	15	...	30	10	2½	"	
104	"	18	3	50	...	30	13	2½	"	
105	"	31	10	10	...	03	11	2¾	"	
106	"	31	12	40	...	50	20	3½	"	
107	"	26	27	25	3	05	19	2¾	"	
108	"	32	9	...	1	20	13	3¼	"	

Analysis of the 108 cases gives the following results:

1. Average age of the 108 cases was 23.88 years.
2. " " " 74 primiparæ was 21.75 years.
3. " " " 34 multiparæ " 27.23 "
4. Average number of days in childbed when the uterine cavity was measured, was 14.46 days.

	Primiparæ.	Multiparæ.
5. The uterine cavity measured 2¼ inches in	10	1
" " " 2½ "	15	9
" " " 2¾ "	18	5
" " " 3 "	10	9
" " " 3¼ "	4	3
" " " 3½ "	5	5
" " " 3⅝ "	1	..
" " " 3¾ "	10	1
" " " 4 "	1	1

6. Average day on which the 2¼ inches measurements were made (15.4 primiparæ, 14 multiparæ) 15.27.
7. Average day on which the 2½ inches measurements were made (13.3 primiparæ, 12.6 multiparæ) 13.03.
8. Average day on which the 2¾ inches measurements were made (13.5 primiparæ, 14.2 multiparæ) 13.70.
9. Average day on which the 3 inches measurements were made (16.1 primiparæ, 12.9 multiparæ) 14.57.
10. Average day on which the 3¼ inches measurements were made (17.2 primiparæ, 12 multiparæ) 15.
11. Average day on which the 3½ inches measurements were made (15.6 primiparæ, 14.2 multiparæ) 14.9.
12. Average day on which the 3⅝ inches measurements were made (13 primiparæ) 13.
13. Average day on which the 3¾ inches measurements were made (18.2 primiparæ, 13 multiparæ) 17.72.
14. Average day on which the 4 inches measurements were made (15 primiparæ, 13 multiparæ) 14.
15. Average length of uterine cavity in 108 cases, was 2.70 inches.
16. " " " " 74 primi. " 2.90 "
17. " " " " 34 primi. " 2.94 "

No.	Primipara or Multipara.	Age	Duration of labor. First stage. h.	m.	Second stage. h.	m.	Day of measurement.	Length of uterine cavity in inches.	Position of uterus at time of measurement.	Post-partum condition. Remarks.
1	Primipara	20	24	25	1	50	13	2¾	Normal.	Septicæmia.
2	"	24	18	10	...	50	13	2¾	"	
3	"	29	17	...	1	15	15	3	"	
4	"	23	3	40	...	50	14	3	"	
5	"	18	15	45	6	23	14	3	"	Forceps; perineum; torn.
6	"	20	4	10	...	13	13	3½	"	
7	"	23	6	40	...	15	15	3¾	"	
8	"	29	16	15	...	35	14	2¾	"	
9	"	22	13	40	...	20	14	2¾	"	
10	"	24	13	30	...	10	14	3	"	
11	"	24	11	55	2	10	14	3	Anteflexion.	
12	"	19	12	25	...	15	12	3	Normal.	
13	"	16	10	40	1	10	14	3	"	
14	"	22	23	30	...	45	12	3	Anteflexion.	
15	"	21	11	35	1	01	12	2¾	Normal.	
16	"	20	10	50	3	10	11	3¾	Anteflexion.	
17	"	26	11	05	...	50	32	4	Normal.	Septicæmia.
18	"	20	7	45	...	30	32	4	"	Septicæmia; perineum slightly torn.
19	"	19	17	...	1	12	13	3¼	"	Septicæmia.
20	"	30	29	40	1	15	3	3¼	"	
21	"	23	5	15	3	40	14	4	"	Forceps.
22	"	18	4	...	2	...	13	4	Right lateral version.	
23	"	21	7	...	1	35	13	3¼	Normal.	
24	"	29	9	40	...	45	14	3¼	Lateral version.	
25	"	18	19	15	...	20	13	3¾	Normal.	Premature.
26	"	25	4	45	...	05	14	3½	"	
27	"	22	6	25	...	50	14	3	"	
28	"	22	50	48	4	30	12	3¼	"	
29	"	21	15	10	2	40	12	3¾	"	
30	"	21	9	30	1	30	13	3½	"	
31	"	28	20	15	...	45	14	3	Anteflexion.	
32	"	27	8	25	...	55	12	3¾	Normal.	
33	"	22	6	50	...	45	18	2¾	"	Mammary abscess.
34	"	20	36	15	1	15	29	3	"	" "
35	"	24	32	20	...	23	11	3	"	
36	"	25	5	55	3	35	13	3	"	Forceps.
37	"	19	20	05	...	25	12	3	"	
38	"	27	15	10	2	40	13	3	"	
39	"	20	7	40	2	...	13	2¾	Slight left lateral version.	
40	"	29	8	40	4	10	15	3	Normal.	
41	"	19	11	...	...	45	13	3	"	
42	"	24	11	...	...	16	12	2¾	Anteversion.	
43	"	22	9	35	...	14	13	2½	Normal.	
44	"	25	21	30	...	25	13	3	Anteversion.	
45	"	21	8	30	1	15	32	2¾	Normal.	Septicæmia.
46	"	23	24	30	...	47	17	2½	"	
47	"	26	6	30	2	...	15	3	"	
48	"	19	16	20	2	05	12	3¼	"	
49	"	20	25	55	...	35	10	3	"	
50	"	23	22	55	2	...	15	3	"	
51	"	24	16	15	0	30	12	3	"	
52	"	24	10	40	6	30	15	3	"	Forceps.
53	"	18	48	...	3	...	14	3	"	Breech; adherent placenta
54	"	39	24	...	...	50	12	3¼	"	Septicæmia.
55	"	19	36	...	2	05	14	2¾	"	

No.	Primipara or Multipara	Age	Duration of labor. First stage. h.	m.	Second stage. h.	m.	Day of measurement.	Length of uterine cavity in inches	Position of uterus at time of measurement.	Post-partum condition. Remarks.
56	Primipara.	26	19	45	...	10	14	3	Normal.	
57	"	20	5	30	...	27	12	3	Anteversion.	
58	"	22	7	30	3	33	15	2¾	Normal.	Septicæmia.
59	"	24	1	45	...	45	12	3	Lateral version	
60	"	21	23	25	1	35	12	2¾	" "	
61	"	23	19	25	...	25	11	2¾	Normal.	Premature.
62	"	18	11	45	2	20	15	3¾	"	Septicæmia.
63	"	16	19	30	...	15	12	2¼	"	Premature.
64	"	20	6	15	1	25	13	3	"	
65	"	18	18	20	5	25	17	3	"	Forceps.
66	"	35	11	...	2	10	14	3	"	
67	"	19	16	15	...	30	18	3	"	Premature ; septicæmia.
68	"	19	6	25	...	20	17	4¼	Anteflexion.	
69	"	22	5	10	...	25	15	2¾	Normal.	
70	"	20	27	30	1	10	14	3	Anteflexion.	
71	"	31	11	35	...	05	15	3¼	Normal.	
72	"	20	10	45	3	55	15	2¾	"	
73	"	20	11	05	3	30	13	3	"	
74	"	19	15	15	1	10	13	3½	"	
75	"	22	8	56	2	25	12	3	"	
76	"	21	8	10	...	30	16	4½	Anteflexion.	Septicæmia.
77	"	22	4	45	...	20	13	2½	Normal.	
78	"	27	14	20	1	25	12	2¾	"	
79	"	25	12	25	8	05	16	2¾	"	Forceps ; perineum torn.
80	"	20	15	10	...	25	14	2½	Anteflexion.	
81	Multipara.	27	12	55	...	28	13	3¼	Normal.	
82	"	25	7	35	...	15	14	3¼	"	
83	"	30	4	10	...	08	14	3¼	"	
84	"	24	4	25	...	20	12	2¾	Anteversion.	
85	"	30	6	30	1	05	12	3	Normal.	
86	"	26	11	20	...	15	12	2¾	"	
87	"	20	9	25	...	20	17	3	Anteversion	
88	"	36	10	45	...	11	16	3½	Normal.	Version ; forceps.
89	"	20	12	30	...	45	12	2¾	"	Premature.
90	"	20	12	45	4	...	22	3	"	Forceps.
91	"	35	34	45	...	18	13	2¾	"	
92	"	23	7	30	...	15	17	3¼	"	
93	"	22	17	25	...	25	13	3	"	
94	"	26	1	...	...	20	12	3¼	"	
95	"	29	5	10	...	15	14	3	"	
96	"	26	5	30	...	30	12	2¾	"	Hydrocephalus.
97	"	30	20	...	1	10	13	2¾	"	
98	"	40	2	30	...	22	15	2¾	Anteflexion.	Septicæmia.
99	"	23	23	...	...	10	15	2¼	Normal.	Mammary abscess.
100	"	28	6	30	15	45	14	3¼	"	Version ; craniotomy ; perineum ruptured.
101	"	19	9	30	1	15	14	3	"	
102	"	23	7	25	...	20	14	4	"	
103	"	31	13	15	...	32	13	3	"	
104	"	24	12	10	...	38	19	3¼	Anteversion.	Septicæmia.
105	"	30	15	25	...	30	14	3½	Normal.	
106	"	24	3	10	...	10	13	3	"	Premature.
107	"	26	14	15	...	20	12	2¾	Anteflexion.	
108	"	29	12	30	...	30	18	3	"	

Analysis of the 108 cases gives the following results:

1. Average age of the 108 cases was 23.63 years.
2. " " " 80 primiparæ was 22.70 years.
3. " " " 28 multiparæ " 26.64 "
4. Average number of days in childbed when uterine cavity was measured, was 14.82 days.

	Primiparæ.	Multiparæ.
5. The uterine cavity measured 2¼ inches in	1	0
" " " 2½ "	4	0
" " " 2¾ "	17	9
" " " 3 "	34	9
" " " 3¼ "	7	4
" " " 3½ "	4	2
" " " 3¾ "	7	3
" " " 4 "	4	1
" " " 4¼ "	1	0
" " " 4½ "	1	0

6. Average day on which the 2¼ inches measurements were made, 12.
7. Average day on which the 2½ inches measurements were made, 14.25.
8. Average day on which the 2¾ inches measurements were made (14.82 primiparæ, 12.88 multiparæ) 14.15.
9. Average day on which the 3 inches measurements were made (14.91 primiparæ, 15.11 multiparæ) 14.95.
10. Average day on which the 3¼ inches measurements were made (14.85 primiparæ, 14.75 multiparæ) 14.81.
11. Average day on which the 3½ inches measurements were made (13.25 primiparæ, 15 multiparæ) 13.83.
12. Average day on which the 3¾ inches measurements were made (13.28 primiparæ, 14.66 multiparæ) 13.70.
13. Average day on which the 4 inches measurements were made (22.75 primiparæ, 14 multiparæ) 21.
14. Average day on which the 4¼ inches measurements were made, 17.
15. Average day on which the 4½ inches measurements were made, 16.
16. Average length of uterine cavity in 108 cases, 3.10 inches.

17. Average length of uterine cavity in 80 primi. 3.11 inches.
18. " " " " 28 multi. 3.10 "
19. Average day on which the uterine cavity was measured in 23 primiparæ, with more or less laceration of perineum, 15.08. Average length of the uterine cavity, 3.14 inches.
20. Average day on which the uterine cavity was measured in 4 multiparæ, with more or less laceration of perineum, 14.25. Average length of the uterine cavity, 3.50 inches.
21. The primipara with a uterine cavity which measured 2¼ inches was a case of premature delivery.

No.	Primipara or Multipara.	Age	Duration of labor. First stage. h.	m.	Second stage. h.	m.	Day of measurement.	Length of uterine cavity in inches.	Position of uterus at time of measurement.	Post-partum condition. Remarks.
1	Primipara.	23	8	40	...	35	15	2½	Normal.	
2	"	23	8	15	...	25	14	2¾	"	
3	"	18	18	...	1	45	14	2½	"	
4	"	27	17	45	2	35	14	4	Anteflexion.	
5	"	22	1	50	...	05	14	2¾	"	
6	"	26	2	...	...	10	17	3¼	Normal.	
7	"	20	17	45	...	45	13	2¾	"	
8	"	34	18	10	4	40	14	2¾	Anteflexion.	Forceps.
9	"	22	5	42	1	18	15	3¼	"	
10	"	20	18	50	1	25	15	2¾	Normal.	Forceps.
11	"	17	19	29	1	46	13	3¼	Anteflexion.	
12	"	26	15	25	2	25	13	2¾	Normal.	
13	"	19	7	05	...	40	12	3	Anteflexion.	Version; prolapse of [funis.
14	"	25	34	05	...	48	12	4	Normal.	
15	"	22	6	15	...	30	11	2½	"	
16	"	23	25	09	...	11	15	2¾	"	
17	"	21	11	...	...	10	19	3¼	"	Septicæmia
18	"	23	11	30	1	15	14	4	Prolapse; retroflexion.	
19	"	19	13	...	...	10	15	3¼	Anteflexion.	
20	"	20	8	30	2	05	14	2¾	"	
21	"	19	14	...	1	05	14	2¾	Normal.	
22	"	17	7	05	...	45	20	4	Retroversion.	
23	"	19	53	15	...	20	13	4	Normal.	
24	"	19	1	15	1	...	13	3	Anteflexion.	
25	"	22	18	30	3	10	16	2¾	Normal.	
26	"	20	14	20	2	05	16	2¾	Anteflexion.	
27	"	19	49	...	3	05	18	2¾	Normal.	Premature.
28	"	28	13	20	1	30	13	3¼	Anteflexion.	
29	"	24	8	15	3	34	17	2½	Normal.	
30	"	29	23	25	1	35	15	3	"	
31	"	25	15	20	2	55	16	2½	"	Forceps.
32	"	29	23	01	1	25	15	3½	"	
33	"	24	9	...	...	40	14	2½	"	
34	"	28	19	10	2	30	13	2¾	"	
35	"	19	17	30	...	35	13	2½	"	Premature.
36	"	20	16	45	...	45	13	3½	"	
37	"	29	27	50	3	10	12	3½	"	Forceps.
38	"	19	7	15	...	35	14	3	Anteflexion.	
39	"	22	5	...	...	45	14	3	"	
40	"	19	8	45	1	10	14	3½	Normal.	
41	"	19	33	...	1	25	17	3½	"	
42	"	21	10	10	1	02	17	4	"	
43	"	23	21	10	1	50	15	3	"	
44	"	22	9	45	...	55	15	1¼	Slight retrovers'n.	
45[1]		19	6	15	1	15	13	3¼	Normal.	

No.	Primipara or Multipara.	Age	Duration of labor. First stage. h.	m.	Second stage. h.	m.	Day of measurement.	Length of uterine cavity in inches.	Position of uterus at time of measurement.	Post-partum condition. Remarks.
46	Primipara.	21	33	...	...	35	16	3¼	Normal.	
47	"	23	7	...	1	...	13	4	"	
48	"	21	7	15	...	45	13	3¼	"	
49	"	21	13	...	5	...	14	3	"	Forceps.
50	"	19	15	...	...	45	14	2½	Anteversion.	
51	"	24	1	40	1	...	11	3¼	Anteflexion.	
52	"	22	21	...	3	...	13	4	Normal.	Forceps.
53	"	22	7	15	1	35	13	3	"	
54	"	18	24	...	1	20	33	3	"	Septicæmia.
55	"	15	8	...	...	55	16	4	"	Version; mania.
56	"	20	8	...	2	05	15	3¼	Anteflexion.	
57	"	22	17	30	2	40	14	4	Normal.	
58	"	24	17	...	1	...	16	3⅝	"	Malaria.
59	"	31	15	10	...	30	15	4	"	
60	"	17	14	20	2	05	15	3½	"	
61	"	20	6	25	1	...	14	4	"	
62	"	22	7	...	...	40	15	3	Anteflexion.	
63	"	17	8	15	...	25	14	3½	Normal.	
64	"	22	16	...	1	25	14	3	"	
65	"	20	4	20	...	15	14	5	Retroversion.	
66	"	21	8	20	1	25	15	2¾	Normal.	Septicæmia.
67	"	21	4	30	1	...	16	3	Anteflexion.	
68	"	16	10	15	3	30	14	3	Normal.	
69	"	15	54	...	5	15	15	3	"	Forceps; perineum [torn.
70	"	21	3	45	...	50	15	3¾	Retroversion.	
71	"	36	6	40	1	35	12	3	Normal.	
72	"	17	11	10	...	25	15	2¾	Slight antevers'n.	
73	Multipara.	23	17	08	...	11	14	2¾	Anteflexion.	
74	"	28	1	55	...	20	14	3¼	Normal	
75	"	24	42	50	...	10	12	2¾	"	
76	"	24	8	05	...	10	12	2¾	"	Footling.
77	"	28	26	30	...	25	14	2¾	"	
78	"	27	12	35	...	27	11	3¼	"	
79	"	21	32	40	...	35 25	13	2¾	"	Twins; footling; prolapsed funis.
80	"	20	15	15	...	30	25	3¼	"	Septicæmia.
81	"	26	4	45	...	35	13	3¾	"	
82	"	36	30	30	...	05	11	3¾	Anteflexion.	
83	"	30	9	45	...	40	13	3½	"	
84	"	26	4	20	...	05	14	3	"	
85	"	22	16	45	...	55	14	3¼	Slight retrovers'n.	Septicæmia.
86	"	34	30	...	1	36	12	3½	Normal.	Face presentation.
87	"	28	17	...	...	45	12	3	Anteflexion.	
88	"	30	5	10	...	10	11	3¾	Normal.	
89	"	21	1	...	...	20	13	3	"	Septicæmia.
90	"	27	3	45	...	10	15	3½	"	
91	"	26	10	...	1	45	13	4	Slight anteflexion.	
92	"	23	5	45	...	20	15	3	Anteflexion.	
93	"	37	9	...	...	25	17	3	"	
94	"	26	5	45	...	15	14	4	Retroversion.	
95	"	19	9	45	...	15	15	4	"	
96	"	30	1	35	...	15	15	4	Normal.	
97	"	22	1	30	...	30	14	4	"	
98	"	28	12	15	...	10	15	2¾	Retroflexion	
99	"	33	3	...	2	25	14	2¾	Normal.	
100	"	21	4	15	...	20	13	2⅝	"	
101	"	24	3	20	1	10	15	3	Anteflexion.	
102	"	20	31	...	...	15	20	3	"	
103	"	30	11	..	...	11	14	3	Normal.	
104	"	22	13	45	...	15	13	2¾	Retroversion.	
105	"	33	6	...	...	15	12	3	Anteflexion.	
106	"	26	3	...	...	20	17	3	Normal.	
107	"	26	1	45	...	30	12	3¾	Retroversion.	Premature.
108	"	18	24	25	1	15	14	3	Normal.	Breech.

Analysis of the 108 cases gives the following results:

1. Average age of the 108 cases was 23.25 years.
2. " " " 72 primiparæ was 21.83 years.
3. " " " 36 multiparæ was 26.08 "
4. Average number of days in childbed when uterine cavity was measured, 14.46 days.

	Primiparæ.	Multiparæ
5. The uterine cavity measured 2½ inches in	8	0
" " " 2⅝ "	0	1
" " " 2¾ "	15	7
" " " 3 "	15	11
" " " 3¼ "	11	4
" " " 3½ "	7	3
" " " 3⅝ "	0	1
" " " 3¾ "	1	5
" " " 4 "	12	5
" " " 4¼ "	1	0
" " " 5 "	1	0

6. Average day on which the 2½ inches measurements were made (primiparæ) 14.25.
7. Average day on which the 2⅝ inches measurements were made (multiparæ) 13.
8. Average day on which the 2¾ inches measurements were made (14.66 primiparæ, 13.47 multiparæ) 14.27.
9. Average day on which the 3 inches measurements were made (15.26 primiparæ, 14.81 multiparæ) 15.08.
10. Average day on which the 3¼ inches measurements were made (14.54 primiparæ, 16 multiparæ) 14.93.
11. Average day on which the 3½ inches measurements were made (14.25 primiparæ, 13.33 multiparæ) 14.
12. Average day on which the 3⅝ inches measurements were made (multiparæ) 16.
13. Average day on which the 3¾ inches measurements were made (15 primiparæ, 12 multiparæ) 12.50.
14. Average day on which the 4 inches measurements were made (14.58 primiparæ, 14.20 multiparæ) 14.47.
15. Average day on which the 4¼ inches measurements were made (primiparæ) 15.

16. Average day on which the 5 inches measurements were made (primiparæ) 14.
17. Average length of uterine cavity in 108 cases, 3.19 inches.
18. " " " " 72 primi. 3.16 "
19. " " " " 36 multi. 3.25 "
20. Average length of uterine cavity in 65 cases measured (39 primiparæ, 26 multiparæ) on the 14th day, 3.22 inches. Average length in primiparæ, 3.21 inches.
" " multiparæ, 3.23 "
21. Average day on which the uterine cavity was measured in 12 primiparæ with more or less laceration of perineum, 14.33. Average length of uterine cavity, 3.01 inches.

No.	Primipara or Multipara.	Age	Duration of labor. First stage. h.	m.	Second stage. h.	m.	Day of measurement.	Length of uterine cavity in inches.	Position of uterus at time of measurement.	Post-partum condition. Remarks.
1	Primipara.	26	8	25	2	55	15	3	Normal.	
2	"	20	11	...	...	30	15	3	"	
3	"	27	11	...	5	05	15	3½	"	Breech; perineum ruptured.
4	"	20	3	45	1	55	14	4	"	Perineum ruptured; septicæmia.
5	"	20	30	...	1	30	14	3	Slight retroversion.	
6	"	22	26	30	5	57	15	3	Normal.	
7	"	21	31	...	...	55	13	3¼	Anteflexion.	
8	"	26	13	30	1	15	14	3	Normal.	
9	"	19	2	...	...	35	13	2¾	"	
10	"	21	15	30	...	30	14	3¼	"	Breech; premature.
11	"	24	8	...	...	35	15	4¼	"	Septicæmia
12	"	26	21	30	...	45	15	3½	Anteflexion.	Breech.
13	"	22	21	15	1	30	14	3	"	
14	"	17	8	45	...	40	14	3	Normal.	
15	"	32	5	30	...	30	14	3	Retroflexion.	Premature.
16	"	21	14	20	1	35	22	3¼	Normal	Perineum ruptured.
17	"	19	26	20	1	25	15	4	Anteflexion.	
18	"	17	42	30	1	10	16	3	"	Septicæmia.
19	"	24	60	{	5	15 } .. 30 }	25	2¾	} Right lateral version.	Septicæmia; Slight tear of perineum
20	"	19	23	10	1	30	13	3	Normal.	
21	"	21	11	...	...	40	14	3	Anteflexion.	Laceration of perineum.
22	"	29	6	30	7	25	15	3½	Normal.	Septicæmia; slight tear of perineum.
23	"	39	48	...	6	15	20	3½	Retroversion.	Craniotomy; macerated fœtus; septicæmia; ruptured perineum.
24	"	24	17	20	1	25	15	3¾	"	Ruptured perineum.
25	"	23	1	30	...	50	14	4¼	Normal.	
26	"	16	17	45	1	15	14	3¾	"	
27	"	26	25	30	3	50	15	3	"	Breech.
28	"	18	15	30	1	25	21	3	Anteversion.	Pleurisy.

No.	Primipara or Multipara.	Age	Duration of labor. First stage. h.	m.	Second stage. h.	m.	Day of measurement.	Length of uterine cavity in inches.	Position of uterus at time of measurement.	Post-partum condition. Remarks.
29	Primipara.	26	10	30	3	55	17	3	Anteflexion.	Septicæmia; laceration of cervix.
30	"	19	29	...	4	...	15	2¾	Anteversion.	Septicæmia.
31	"	22	33	...	...	30	13	3	Normal.	Torn perineum.
32	"	21	3	45	...	45	15	3½	"	
33	"	22	11	...	2	...	14	3½	"	
34	"	23	8	...	2	30	13	3	Anteversion.	
35	"	18	14	45	2	...	14	3¼	Normal.	Septicæmia.
36	"	33	3	45	1	45	14	3¼	"	Adherent placenta.
37	"	20	26	...	...	45	14	4	Right lateral version.	
38	"	20	12	...	1	45	15	3¾	Normal.	Septicæmia; perineum ruptured.
39	"	23	3	45	2	30	14	3¼	Left lateral version.	Perineum ruptured.
40	"	20	8	...	3	...	17	3¼	Normal.	Septicæmia; perineum ruptured.
41	"	17	6	...	...	30	14	4¼	Retroversion.	Eclampsia.
42	"	23	11	15	...	55	14	3½	Normal.	
43	"	27	3	45	3	45	14	3	Anteversion.	Post-partum hemorrhage.
44	"	16	26	10	1	30	14	4	Left lateral version.	Perineum lacerated.
45	"	21	13	...	1	35	15	3¾	Anteflexion.	Septicæmia.
46	"	20	25	15	...	40	15	3½	Normal.	
47	"	25	32	30	3	30	23	3	Left lateral version.	Forceps; malaria.
48	"	18	18	15	...	45	15	3½	Retroversion.	Septicæmia.
49	"	27	10	...	2	15	15	3¾	Left lateral version.	
50	"	28	20	30	2	45	16	2¾	Left lateral version.	
51	"	23	19	45	2	20	15	3	Anteversion.	Retained placenta; post-partum hemorrhage; septicæmia.
52	"	20	35	20	1	35	15	2¾	Retroflexion.	Forceps.
53	"	24	12	30	1	...	14	3¾	Anteversion.	
54	"	24	11	...	1	45	11	3¾	Normal.	Perineum lacerated.
55	"	15	5	45	1	50	13	4	"	
56	"	28	21	...	1	...	15	4¼	"	
57	"	22	27	15	1	...	12	4	"	
58	"	22	10	...	...	15	15	3¼	Anteversion.	
59	"	23	13	20	...	30	15	3	"	
60	"	21	8	...	1	...	15	4	Normal.	
61	"	23	11	30	...	45	13	3⅝	"	
62	"	33	5	30	...	15	15	3¾	"	
63	"	27	53	45	...	30	14	4	"	
64	"	21	11	30	...	45	25	2¾	Anteversion.	Septicæmia
65	"	21	9	...	...	30	12	3¾	"	
66	"	21	22	15	1	...	12	4	Normal.	
67	"	21	12	30	...	20	12	4	"	
68	"	18	11	45	1	15	15	4	Left lateral version.	
69	"	20	10	20	1	20	13	3½	Normal.	
70	"	27	18	45	11	...	34	3¼	"	Lacerated perineum septicæmia.
71	"	23	21	...	7	45	14	4	Right lateral version.	
72	"	23	35	40	...	10	13	4	Normal.	Cervix lacerated.
73	"	19	37	...	1	10	14	3⅝	"	" "
74	"	25	28	...	3	50	14	3	Retroversion.	" "
75	"	18	6	30	...	45	13	4	Slight retroversion.	

No.	Primipara or Multipara.	Age	Duration of labor. First stage. h.	m.	Second stage. h.	m.	Day of measurement.	Length of uterine cavity in inches.	Position of uterus at time of measurement.	Post-partum condition. Remarks.
76	Multipara.	17	6	...	...	35	13	3¼	Normal.	
77	"	43	1	15	...	05	15	3	"	Breech; premature.
78	"	23	18	...	...	40	15	2¾	"	
79	"	23	6	...	...	35	14	3¾	"	
80	"	25	3	15	...	25	14	3½	"	
81	"	22	2	15	...	10	15	3	"	
82	"	37	29	50	...	05	13	3	"	
83	"	40	11	20	...	05	13	3	"	
84	"	26	..	20	...	05	14	2¾	Anteversion.	
85	"	24	16	30	1	...	15	3	Normal.	
86	"	23	18	...	...	30	14	4¼	Antellexion.	Premature; septicæmia.
87	"	23	2	30	1	15	14	3	Retroversion.	
88	"	28	14	30	1	45	16	4	Normal.	Version.
89	"	22	11	50	...	10	14	3¾	"	
90	"	24	14	...	1	10	12	3¼	Anteversion.	
91	"	30	2	...	...	30	14	3¼	Normal.	
92	"	23	9	45	1	...	14	2¾	Anteversion.	
93	"	24	12	...	...	50	13	3¼	Retroversion.	Face presentation.
94	"	29	14	15	...	55	14	3	Anteversion.	Epilepsy.
95	"	32	6	15	1	20	13	2¾	"	
96	"	37	3	45	1	15	21	3½	Normal.	
97	"	24	16	...	1	20	11	3¼	"	
98	"	27	19	30	3	...	14	3¼	Anteversion.	
99	"	26	1	50	5	10	13	3	Normal.	
100	"	33	12	...	...	30	14	3½	"	
101	"	20	12	45	...	30	16	3½	Anteversion.	
102	"	25	6	30	...	15	14	3¾	"	
103	"	33	6	30	3	55	13	3½	Normal.	
104	"	34	6	...	...	40	13	4	"	
105	"	31	4	...	?		14	3¼	Retroversion.	
106	"	31	7	45	...	10	16	3¾	Normal.	
107	"	34	20	...	...	05	11	3¼	"	Laceration of cervix
108	"	24	25	30	6	...	14	3¼	"	" "

Analysis of the 108 cases gives the following results:

1. Average age of the 108 cases was 24.04 years.
2. " " " 75 primiparæ was 22.53 years.
3. " " " 33 multiparæ was 27.48 "
4. Average number of days in childbed when the uterine cavity was measured, 14.83.

		Primiparæ.	Multiparæ.
5. The uterine cavity measured	$2\frac{3}{4}$ inches in	7	4
" " "	3 "	21	8
" " "	$3\frac{1}{4}$ "	7	8
" " "	$3\frac{1}{2}$ "	10	5
" " "	$3\frac{5}{8}$ "	1	0
" " "	$3\frac{3}{4}$ "	16	5
" " "	4 "	9	2
" " "	$4\frac{1}{4}$ "	4	1

6. Average day on which the 2¾ inches measurements were made (17.57 primiparæ, 14 multiparæ) 16.27.
7. Average day on which the 3 inches measurements were made (16.09 primiparæ, 14 multiparæ) 15.51.
8. Average day on which the 3¼ inches measurements were made (15 primiparæ, 13.12 multiparæ) 14.
9. Average day on which the 3½ inches measurements were made (15.20 primiparæ, 15.60 multiparæ) 15.33.
10. Average day on which the 3⅝ inches measurements were made (primiparæ) 13.
11. Average day on which the 3¾ inches measurements were made (14 primiparæ, 14.40 multiparæ) 14.09
12. Average day on which the 4 inches measurements were made (13.66 primiparæ, 14.50 multiparæ) 13.81.
13. Average day on which the 4¼ inches measurements were made (14.50 primiparæ, 14 multiparæ) 14.40.
14. Average length of uterine cavity in 108 cases was 3.39 inches.
15. " " " " 75 primi. " 3.42 "
16. " " " " 33 multi. " 3.31 "
17. Average length of uterine cavity in 63 cases (38 primiparæ, 25 multiparæ) measured within the 14th day, 3.41 inches.
    Average length of primiparæ, 3.48 inches.
    " " multiparæ, 3.32 inches.
18. Average day on which uterine cavity was measured in 24 primiparæ with more or less laceration of the perineum, 16.33. Average length of uterine cavity, 3.56 inches.
19. Average day on which uterine cavity was measured in 4 multiparæ with more or less laceration of the perineum, 14.25.
    Average length of the uterine cavity, 3.50 inches.

LAPAROTOMY FOR INTRA-PELVIC PAIN.

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Intra-pelvic pain is associated with a number of intra-pelvic conditions of structural, inflammatory, and neuralgic origin.

So far as my observation goes, the severity of the pain bears no appreciable relation to the magnitude of the intra-pelvic condition. Several of the largest growths I have ever met in the pelvis and abdomen gave rise to no severe physical suffering apart from the mere mechanical pressure due to their presence. On the contrary, the most intense form of intra-pelvic pain which I have ever observed was associated with no appreciable lesion within the pelvis, ascertainable by the ordinary methods of exploration. Pain, then, as a symptom, may be considered to stand alone, and not necessarily to depend upon lesions which can be recognized by the usual physical signs employed in the diagnosis of intra-pelvic disease. I wish, therefore, to present an argument in favor of the exploratory incision as an aid to the diagnosis and treatment of intra-pelvic pain, dependent upon conditions which cannot be ascertained or successfully treated except by this method.

Ovarian neuralgia is a well-recognized condition. The periodicity with which it comes and goes, the severity of its attacks in given cases, the stubborn resistance it makes to therapeutic agents, and the hopelessness of its subsidence in many instances, invest its study with peculiar interest and

importance. Experience has long since shown that many of these cases are hopelessly incurable until the menopause has been established, and that they not infrequently continue long after the periodic cycle has passed over. What to do with such individuals is a difficult problem to solve when the various methods of treatment have been attempted with no satisfactory conclusion.

The so-called palliative treatment may have its advantages when the social condition and environment of the patient favor a recourse to such methods, but take those unfortunate women who must either continue breadwinners or fall helpless into the hands of the charitable, what physical or mental life or hope is there in a purely palliative regimen? Undoubtedly these women appeal most loudly and piteously for help, and it is just to this class that the instrumentality of surgery is most effective. Worn out with the struggle against pain and disability, such women assent with cheerfulness to operative intervention when its advantages and risks are calmly stated to them. When useful occupation is so impaired or destroyed, by the severity of these attacks of intra-pelvic pain, that the life of the individual is a burden to herself and oftentimes to her friends, what excuse remains for withholding the advantages of a laparotomy when experience has so clearly shown that the trouble is removable at comparatively little risk by this procedure? Nor do I think we are warranted in every instance in waiting for the condition of semi- or total invalidism to warrant the operation of laparotomy in such conditions. There is always danger of an unnecessary resort to surgical intervention in intra-pelvic work, yet it seems to me this danger can be escaped if the surgeon will eliminate from his work the element of uncertainty which comes from the too casual study and observation of such cases, and employs the operation only in such cases as have been under the closest personal observation or which present histories of the most positive character. The nervous and hysterical element should always be discounted

in deciding the question of operation, for it is well known the desire may precede the suggestion, and the surgeon may unwittingly fall into the plan arranged for him by the preconceived wishes of the individual. The elimination of such errors of diagnosis as are here suggested removes the only uncertain quantity, and we are clear to proceed with operative work when the indications warrant us in instituting it. In deciding such a question I hold that the wishes of the patient and of her friends must largely influence the decision of the surgeon. He is dealing purely with a subjective state, and has no data to guide him but subjective symptoms. The gravity of these symptoms is only appreciable through the impressions conveyed by the patient, and he must, therefore, of necessity leave the acceptance of operative treatment to her decision. With the woman it becomes a question of debit and credit, and she should be assisted in making the account balance by judicious medical advice.

The severity and character of her suffering are largely communicable to her friends and to her physician. Her subjective condition is not a sealed book, but an open page on which can be read by the intelligent observer every letter and line indicative of her physical and mental distress. By close observation the careful clinical observer can, with rare precision, separate these cases into two classes, those justly entitled to operative interference, and those not coming under this privilege. Mistakes may occur in dividing the lines, but they can be reduced to a very small percentage if all the facts bearing upon the social condition and environment of the individual case are properly estimated.

The surgeon who will carefully follow this line of reasoning and of action will have it within his power to confer immense good upon a large class of women who are useless to themselves and to society. Ovarian dysmenorrhœa will largely cease to be an opprobrium of the gynecological art.

But apart from the large class of women who suffer from neuralgic conditions within the pelvis, there is a distinct

class of lesions which involve the pelvic organs which give rise to decided and severe forms of intra-pelvic pain. These lesions are often impossible of recognition by any other method of exploration than through the abdominal incision. They may be grouped under the head of minor forms of displacement, chronic inflammations, adhesions, and vascular disturbances. They resist treatment as obstinately as the neuralgic conditions, and just as loudly call for surgical intervention. Nothing short of a removal or correction of the condition by an intra-pelvic operation will accomplish a satisfactory result. In the management of such cases the surgeon is clearly in the line of duty when he makes use of the only rational method of diagnosis and of treatment for such conditions by opening the abdomen and boldly attacking the condition *in situ*. In such cases the old adage holds too true, "Nothing risked, nothing gained."

When we weigh in one scale the danger of a laparotomy and in the other the benefit conferred upon this class of individuals, the balance will show a most handsome profit to the account of the surgeon and to his patients. I have had no accurate way of collecting statistics to prove this assertion, for this class of work is too recent to furnish reliable data, but I am prepared to believe there is no condition for which laparotomy is performed in which the mortality rate should be so low. If over five per cent. of such cases perish under such conditions, we should refer such results to the circumstances under which this work is executed, and not to the conditions removed. I may be open to criticism for making such an assertion without the evidence to support it, but my convictions are so positive that a laparotomy should be approached in the treatment of this class of cases, that I am willing to throw the burden of proof upon anyone who is in a position to disprove my statement.

I have seen in my own experience such decided and positive benefits result from the abdominal incision instituted in behalf of this class of patients that I shall feel that my duty to this

class of sufferers is not conscientiously performed, if after a careful and negative use of the palliative methods of treatment I do not urge the advantages of a laparotomy with its risks and casualties. Whatever view we may take of such cases there is a personal element which must be considered, and upon this factor we must largely depend. Such individuals are in no danger of their lives when treated tentatively. They may go from month to month and from year to year somewhat better, somewhat worse, from day to day. If they elect this course, who is responsible for the decision? Certainly not the surgeon, if he clearly presents facts and data to their careful consideration. But reverse the picture: Let the medical adviser be a man of narrow prejudice or a careless observer of the progress and advancement of the surgical art, and he will so distort and magnify the aim and methods of the abdominal surgeon that his patient will endure the tortures of the damned rather than invoke a rational instrumentality. I am not exaggerating facts when I say these patients are daily falling into the hands of the abdominal surgeon. They come with a tale of woe and lamentation, and go away rejoicing in the hope of human aid and skill. The simple hope of a way of escape from years of physical and mental bondage at once takes possession of the vast majority of this class of women, and when calmly and honestly told of the dangers of a laparotomy and its probable benefits, many of them, if left alone to reach a decision, soon come to a positive and hearty conclusion and courageous acceptance of its instrumentality in their behalf.

I feel that I stand on the highest moral ground when I protest against the prejudice and narrow conservatism which exaggerate the dangers of laparotomy and which depreciate the good it can and does confer upon this invalid class of women. I have no desire to defend a single unnecessary resort to a surgical expedient, but I do say, when all else fails and life is yet without hope and comfort, what right has any man to cry out against a rational procedure which involves

comparatively little risk and may confer untold good upon a worn-out and useless life? I have had a recent experience which illustrates my position in regard to this class of patients so happily that I shall close my argument with a brief recital of the case in question. On the 23d day of April of the present year I was invited, by one of the oldest and most respected general practitioners of my city, to see a lady in consultation with him who presented the most perfect picture of the invalid class.

The lady in question was thirty years of age, unmarried, of high social position, exceedingly intelligent, cultivated, and bright. In physical organization she was delicate and neurasthenic, but mentally possessed remarkable courage and fortitude. She was free from every suspicion of hysteria or nervousness. Her physical condition had been lowered by extreme physical suffering, whilst her mental faculties triumphed against fearful odds over her disabilities.

She had made a brave fight for life and hope, yet years of constant intra-pelvic pain had well-nigh exhausted both body and spirit.

From the age of fourteen years to the time of my visit she told me she had never known a moment when awake that she did not feel more or less pain in the left ovarian region. She was ever conscious of discomfort in that locality. When not in agonizing pain there was a tired sensation which never let up. At the menstrual period this pain was greatly intensified, often it was agonizing, and anodynes gave only partial relief. For the past four years she had not been able to rest on the left side. The weight of the bedclothes gave discomfort. Mere pressure of the hand was unbearable. For some months past she had given up all out-door exercise, and was confined to her room or lounge with no heavier garments than a warm wrapper. Her general health had sympathized with her local distress, and she was suffering from poor digestion, asthma, restless nights, bodily fatigue, and a whole train of minor ailments.

For these varied symptoms she had been treated by her physician, who was at the same time a friend and relative, and per-

sonally deeply interested in her case, with every known remedy for such conditions. He frankly told me he had exhausted the list of agents, and, in placing me in charge of the case, expressed the opinion that he had left me nothing to employ in the list of therapeutic remedies. I was invited to see the case as a specialist, and with the hope that some local method of treatment might prove of service. Up to this time a vaginal examination had not been made. No attempt had been made to ascertain the cause of the local distress. It had been treated symptomatically, not as a lesion.

Upon the occasion of my first visit I made a vaginal examination with extreme difficulty and with no satisfactory conclusion. The only thing I did was to discontinue all drugs, to place the patient on a very nutritious and easily digestible diet, and to order hot-water vaginal injections. From this time on for the next two months I employed every method at my command to improve her general health and to make an intelligent diagnosis. In the former I succeeded, in the latter I utterly failed. Apart from an anteflexion of the uterus and some downward displacement, I could make out no satisfactory intra-pelvic condition to account for her distress. The pain in the left ovarian region was constant, and at times intense. It defied my powers of analysis. Even under chloroform I could find no condition to explain its presence. The patient was in constant suffering, and while her general health improved under a most nutritious regimen, her pain did not abate one jot or tittle.

I used pessaries, hot-water, blisters, and lastly electricity, to say nothing of massage, ointments, and the like. Two or three weeks of close attention convinced me there was only one thing else to do—either to abandon the case as incurable or open the abdomen and ascertain what the condition was and whether it was not removable. I stated these views to the patient and to others interested in her. My professional consultants admitted that there was nothing else to do. All hands wished a longer trial of the palliative agents, to which I assented with the object in view of proving their absolute worthlessness; whilst I had no faith in such a course of action, I followed it as rationally and faithfully as it was possible to do.

To make a long story short, the patient and her friends assented

to a laparotomy, and on the 18th of June the abdomen was opened and her ovaries and tubes were removed. She made a very prompt recovery from the operation, and from that day to the present has not had one single tinge of intra-pelvic pain. The cure was radical and complete. I append a few sentences from a recent letter, bearing date August 24, 1890, to show her present condition and her grateful appreciation of the service rendered. After expressing the gratitude she feels, she says: "You have really given me a new life. When you came to me I had lost all earthly hope. My life was one of martyrdom, and I was longing for the time when death would give me relief. Many times I could have prayed to die but that my faith taught me that life was a precious treasure which we should value and do all in our power to preserve. So all I could do was to suffer and try to be patient. Year after year the pain grew worse. Each attack was more severe and longer, and as time wore on I became more and more an invalid. Words cannot express the relief I feel since the operation. The world and everything in it appears to me in a new light. Life is now a joy, and I can appreciate the happiness and blessings with which God has so surrounded me. To understand the relief one must have suffered the pain, so I feel that anything I could say would be adequate."

I have no comments to offer on such language. If this patient does not experience every word she has written, then my senses are impaired and I desire to be placed under mental treatment.

But apart from the most satisfactory outcome in this case, I was most deeply interested in the anatomical and pathological conditions found in her pelvis. These conditions, as I have stated, were not ascertainable prior to the opening of the abdomen. They were not appreciable by the usual physical signs at the command of the gynecologist, from the fact that the depth of the pelvis and thickness of the abdominal walls prevented those nice delineations which often make it possible to recognize minor conditions by the touch and palpation.

The left ovary was chiefly involved, and it was in the left ovarian region that pain had been experienced. On this side

the broad ligaments extended from the uterus to the pelvic brim as two parallel folds of membrane, as tense and unyielding to pressure as a drum-head. Between the ligaments the ovary was firmly caught and held as if in a vice. The ovary itself was small and presented a condition I have observed in several other cases of ovarian dysmenorrhœa. The organ was studded with corpora lutea, some six or eight in number, in different stages of degenerative change, and presenting the appearance of and as large as the corpus luteum of pregnancy at about the fourth month of gestation. In other words, cicatrization following ovulation was retarded and incomplete, and the ovary was kept in a condition of continued congestion by this irregular process of repair. In the right ovary only two corpora lutea were observed in this condition.

Whether the interference with normal ovulation was the occasion of the intense intra-pelvic pain, or the abnormal anatomical relations of the peritoneal folds were responsible for the condition, I am not able to say; but this fact is positive, the removal of the condition gave immediate and permanent relief. Within six hours after the operation the patient voluntarily stated that she experienced relief in the left ovarian region. Her pain disappeared absolutely within forty-eight hours, and up to the present time she has not had a trace of her former suffering. She has not menstruated since the operation. She is now going around and enjoying health commensurate with her physical condition in other respects.

I present these anatomical and pathological conditions to your consideration with the hope that some one whose experience in such matters is larger than my own will give a more accurate account of the condition than I am able to do.

DISCUSSION.

Dr. Howard Kelly, of Baltimore.—I know Dr. Ashby will not think I am personal if I object strongly to the occurrence of "laparotomy for pain," in his title. The generic term "laparotomy for pain" carries us back to the early years of abdominal work, when we were unable to detect pelvic disease by bimanual palpation. Since those earlier days "pain" is talked of less and disease more; thus "ovaralgia" is a disease of which we now hear but little, and it is a condition which I never diagnose. If I cannot find out what is the matter, I do not call it "ovaralgia," but put it down to ignorance of pelvic pathology. Operations for pain would lead us into many serious errors, such as removing the ovaries for displacement or vascular disturbances, a dangerous plan; opening up an enormous operative field, it is true, but carrying us back to the practice of six or eight years ago, when laparotomy was too often not a last, but a first resort. We ought to make out diseased conditions of the ovary by careful bimanual examination. A cultivated touch will even reveal delicate adhesions binding down ovary and tube. In every uncertain case an examination should be made *under an anæsthetic*, before deciding what plan of treatment to pursue. It is astonishing how things sometimes clear up in this way.

There is another very important way of reaching the ovary, which I have employed for some time past, by which I can make out conditions I did not formerly detect; namely, by using my corrugated tenaculum, by means of which I can draw the uterus down—often without an anæsthetic—almost to the vaginal outlet; this is held by the third and fourth fingers on the ball of the thumb, leaving the index finger free to use in the vagina or rectum in combination with the other hand on the abdomen. The ovaries are thus brought down and are usually easily reached. When I find difficulty in detecting the lesser diseases, particularly the presence of slight adhesions, I find by the following means I can always reach the ovary: I push the uterus down in the pelvis in retro-position with my abdominal hand, so that the posterior curve of the uterus corresponds to the curve of the lower

part of the sacrum. The index finger of the other hand is then introduced through the rectum and feels for the ovary, the characteristic, almond-shaped body slipping around under the finger. When it is not at once detected in its usual position, I then go to the ovarian ligament, running my finger up to the fundus uteri, and then drawing it down close to the uterus along the posterior surface of the broad ligament until I feel, from 1½ to 2 cm. from the top, a sharp, resisting band running outward from the body in the direction of the pelvic wall on each side of the uterus, markedly different from any other band about the uterus, except at the lower segment in the region of the utero-sacral ligaments. This band is the utero-ovarian ligament; having found this, it is easy to touch the ovary by simply following it out for 2 cm., where it is attached to the inner angle of the organ.

In women in the better class of society we have no right to remove the ovaries for adhesions or displacements from pelvic diseases until we have long persisted in treatment; sometimes these cases improve after years of treatment. In the working class of women I think we are justified after a shorter period of treatment in adopting the more radical means, but excepting in the cases where we have positive proof in the shape of attacks of pelvic peritonitis and many adhesions, we ought not to operate until all other means are exhausted.

My remarks, Mr. President, were evoked by a few words in the title of the paper which called up forgotten pictures of the past. I must apologize to Dr. Ashby, for they did not apply to his paper, and in a similar case I would adopt the same plan which Dr. Ashby so skilfully and with so much success put into practice. Reports of this kind are very instructive.

Dr. A. Palmer Dudley, of New York.—I think that this subject, which is so important, ought not to be closed with a limited discussion. I cannot agree with Dr. Kelly's opinion that we should not perform laparotomy for pain. I did not understand Dr. Ashby to say that he did so, but that he performed laparotomy *for the relief of the condition that produced the pain.*

It is utterly impossible for any of us, I do not care how much skill we may have, or how perfect we may become in manipula-

tion, to make a correct diagnosis in every case of pelvic disease, even though a patient is thin and emaciated. There are certain conditions of the ovary which it is utterly impossible to demonstrate by bimanual touch. I have seen it in my own practice and in the practice of men very much better than I am, and when we have a patient who gives us a history such as the one which Dr. Ashby has given us to-day, we owe it to ourselves and to the patient that we should perform laparotomy for the relief of the condition that produces that pain.

The condition which he speaks of here is a very interesting one, that of atrophy of an ovary (or the vascular tissue in it), surrounded by bands of adhesions, and he calls attention to three or four reasons for this pathological condition. He mentions vascular disturbance, subacute or chronic inflammation, and minor adhesions. I place vascular disturbance first, as I believe it to be the starting-point of the majority of pelvic diseases in women. If we remember our anatomy, we know that the circulation differs in the female from that of the male; there are no valves in the ovarian veins, which are some nine or ten inches in length. On the left side—and I know you will bear me out in saying that the left side is the most often affected in women—the vein is pressed upon by the sigmoid flexure of the colon, passing not only behind that, but into the renal vein without a valve; it is obstructed from above by the transverse circulation from the kidney, and under such conditions it has to make its way from the uterus and the broad ligament up into the renal vein. For this reason I place disturbances of the circulation first as the cause of these troubles, and some two years ago I read a paper upon the subject and gave the history of four cases of what I considered to be varicocele in the female. At that time it was considered to be somewhat of a myth, but I am happy to say that Skene, Lusk, Polk, Nilsen, and Currier have since found cases of that kind in which the veins were enormously dilated in the pelvis. As a result of this chronic congestion, especially at the menstrual period, you get osmosis and low subacute inflammation, and from that, adhesions. When adhesions have once taken place in the female pelvis and become firmly fixed, I contend it is impossible to destroy those adhesions by any

process of manipulation or massage. Therefore, if you have any such condition as Dr. Ashby has demonstrated in this case, I contend we do not do our duty unless we make a laparotomy. I do not say that we should always remove such an ovary, and during my last year's experience I have three times saved the ovaries and tubes in cases similar to the one the Doctor has described, with this result: The patients were all young married women, they were invalids and every menstrual period was attended with severe pain. I tried every means of palliative treatment in the three cases for two years, three years, and six months, respectively. I made minor operations upon two of them, but did not relieve them a particle. Then I resorted to laparotomy, broke up the adhesions around the ovary, found the tubes were pervious, transfixed the ovary with a sharp needle, and drained some ten cysts in each ovary, allowed the cyst cavities to refill with blood and then dropped the ovary back. The first case was operated upon last December, the other two in April and May of the present year. Before coming here I obtained a history of their condition at the present time. In all three of the cases the pain was relieved from the date of the operation. I fastened the uterus forward by a method which I shall describe in the future, without attaching it to the abdominal wall, and the patients tell me that from the date of the operation they have had no pain at the menstrual period. Physical examination of two of them last Friday and Saturday revealed their condition to be this: the uterus in perfect position and no adhesions about the ovary that I could diagnose no pain on palpation, no pain due to household duties; and they were, so far as they knew themselves, perfectly well.

So I believe that there are cases which we can save by this method of treatment; at any rate, I think it is worth trying. I would like to hear from some member of the Society who has had some experience similar to this, and I hope we shall hear from Dr. Polk.

Dr. William M. Polk, of New York.—As I understand it, sir, I am called upon to speak upon two points. First, in direct comment upon Dr. Ashby's paper, and next upon certain remarks made by Dr. Dudley.

As I interpret Dr. Ashby's paper it is nothing more than an advocacy of exploratory incision, and in that view of the case it seems to me that the doctor is entirely right. I am very well aware, sir, that a great deal has been said concerning the too great freedom with which the abdomen is entered, and I am well aware that some ugly words have been used toward those who advocate this procedure, and I take it that Dr. Ashby's paper is rather a protest against such condemnations than the advancement of any distinctly new idea or theory upon the subject. With that view of the paper, I really think we owe him thanks, and I am satisfied that my friend, Dr. Kelly, will say the same thing, notwithstanding the fact that he has criticised the doctor a little.

It is extremely interesting to find that since the days of appendicitis—which, by the way, is found to exist in the male as well as the female—that this opening of the abdomen has been extended somewhat, and our own sex is at last brought face to face with the proposition that our intestines are to be examined and looked into. I find that this one fact has done more to upset all the nonsense (pardon the word) than has been uttered and expressed from time to time in regard to this question of laparotomy than any other one consideration that has been entertained by our profession ; therefore, sir, I think that the gentlemen of the Gynecological Society owe a moment to the male appendix. But I beg the Society's pardon for indulging in this chaff, and now to come down to the facts of the paper. First, in reference to the necessity of laparotomy upon the line suggested by Dr. Ashby. Dr. Kelly has said that by the rectal and vaginal methods of examination he could always succeed in making out diseased conditions of the ovaries, the patient being under anæsthesia. That, of course, is a rule, but I am sure that Dr. Kelly will acknowledge that there are exceptions to the rule. Now, of course, no one case should be taken as establishing a rule, but unquestionably we have cases in which the method of examination in question is not sufficient, carried out even in the most dexterous manner by the most delicate and well-instructed touch. I had a patient in my ward who, I am thankful to say, was examined by a number of physicians, men who would all

come within the description just suggested. That woman had pelvic pain, and half of them said that it was due to malaria. I confess that with the bimanual methods I could not find anything abnormal in that woman's abdomen. She was rather stout, I admit, which made me feel that I was going to discover something on opening the abdomen, which I did. I found her pelvic organs, including the omentum and intestines, one universal mass of loose adhesions that were long enough to permit the greatest amount of latitude of motion in the structures in question. I had to work my way down through the loose adhesions with the utmost care to get at the ovaries and tubes. I sacrificed them, but inasmuch as I do not now believe that the pain was dependent upon anything but the adhesions that existed, I fear that the operation did little good, for the reason that to relieve her of the adhesions I would have had to dissect coil of intestines from coil of intestines. These adhesions existed in great quantity and were of such a character as would permit of what we consider the normal amount of latitude of motion on the part of the structures in question.

Now, in regard to the point raised by Dr. Dudley. It is particularly gratifying to see that we are beginning to work along a different line from that of complete amputation, and that we have at last reached the conclusion that it is admissible to attempt a partial extirpation rather than complete amputation, and the suggestions made by Dr. Dudley are in that line. Now, sir, you can make an exploratory incision in an ovary just as well as into the cavity of the abdomen. I have laid a sound ovary open from its outer periphery to the hilum—wide open as you would an apple, or the kidney when you cut it for post-mortem examination with a view of finding out whether it is diseased, and then sewed it up and put it back, and the woman suffered not the slightest inconvenience. Now, mind you, I do not intend to say that we should indulge in that kind of incision of the ovary, but the result in that case (while, as I said before, one case does not establish a principle) at least opens the door through which we may pass and perhaps find a road that will lead to something else than amputation in all cases. In this connection, I beg leave to call your attention to certain

work done by Martin, of Berlin, in which he amputates the dilated infundibulum of the tube, and allows the patent amputated tube together with its sound ovary to remain in the cavity of the pelvis. The more I look into this question, sir, the more I am satisfied that it is our bounden duty to endeavor by every means in our power to keep as much ovarian stroma—provided it be sound—in the cavity of the woman's pelvis as is compatible with her health and usefulness. You may say that is a pretty broad "if," but I will attempt to enter into a definition by what I mean by that. I merely mean to say that there are many of these ovaries that we can leave in if we partially eradicate. Many ovaries have one or two small-sized cysts, which can be enucleated and the ovary allowed to remain. It is gratifying to find that whereas in the beginning of our abdominal work, when a man opened the abdomen nothing satisfied him short of taking out everything he could lay his hands upon, to-day we recognize a number of improvements in this direction. First, that catarrhal salpingitis does not justify amputation; and again, five years ago it was not admitted that mere adhesions in the pelvis binding down the tube and the ovary did not justify amputation. I trust, sir, that we shall be able to work in the same line and develop further conservatism in the direction which I have suggested.

Dr. H. T. Byford, of Chicago.—It would almost be inferred from the propositions in the essay that we could always cure ovaralgia that had resisted all treatment by removing the ovaries. Yet I have recently had a case that had been faithfully treated by physicians and gynecologists, in which I used all manner of treatment for a year, including a successful Alexander's operation for retroversion, and finally removed the ovaries without benefit.

I would also venture a remark about some of the improvements suggested by Dr. Polk. My experience has been that when we introduce sutures into the ovary, or wound it to any extent, exudates and adhesions will occur. Hence I would rather remove the organ than interfere much with it. I would aspirate cysts, but would not extensively incise or suture the organ. I have once been obliged to remove an ovary for pain-

ful and persistent adhesions, due to suturing the ovarian ligament. While I admit that ovaries need not always be removed for adhesions, yet I believe that it is usually more conservative to remove extensively diseased ones after the abdomen is open, than to leave them.

Dr. Matthew D. Mann, of Buffalo.—The question of the removal of the ovaries for pelvic pain is certainly a very difficult one to decide, and all of us who do laparotomies must have seen cases where we were puzzled to know what it was best to do. I do not believe that in all of these cases we can make an absolute diagnosis of the condition of the ovary before the abdomen is opened. I am sure we have all been surprised to find conditions existing which we hardly suspected, even after a careful examination under ether. On this ground, therefore, I think we can commend Dr. Ashby's position, and say that the exploratory incision is often advisable.

Now, supposing we open the abdomen, and do not find any very gross lesions, no greatly enlarged ovaries or diseased tubes. We take an ovary and tube up, and examine carefully, cutting the ovary open for the purpose of finding out the lesions, as Dr. Polk suggests. When this is done, are we certain that with this examination we can recognize all the disease which exists? We know that there are some diseases of the ovary which have been described lately, which can only be demonstrated under the microscope, although they give symptoms which may enable us to suspect their presence. Now, if we lay the ovary open, can we recognize these diseases or any similar fine lesions, and yet these conditions may exist and cause pain. This is the objection to this method of trying to diagnose minute diseases of the ovary, and treating them without removal of the ovary.

Treating the ovary without removal is referred to by Dr. Polk, but I do not see how he can take the cysts out and then sew up the organ without the certainty of adhesions forming between the ovary and parts around, and if adhesions form, the condition is as bad as, or worse than, before. So, although I should be willing, perhaps, under certain circumstances, to try this method, I am not very hopeful that it is going to do much good. It is new; it has not been sufficiently tried, and the crucial test

is experience, but I do not have much hope of great help in that direction.

One more point regarding pain in the pelvis. I believe that in a great many cases the abdomen has been opened and the ovaries removed, where the trouble was not in the ovaries or tubes at all, but in the ureters. We heard a great deal about the ureters yesterday, and I believe that disease of the ureters is extremely common. We find them enlarged and tender, the pain being often attributed to ovarian disease.

A patient came to me not long ago who had been examined by two or three men in her town, and removal of the tubes and ovaries had been advised. There was no trouble in the tubes or ovaries, but the ureters were so tender that the patient shrieked when I touched them. The urine was full of uric acid, and treatment in this direction has given her great relief. I think this is a point which is generally overlooked in these cases of pelvic pain.

Dr. Polk.—May I ask Dr. Mann one question? Of course, the principle is this, sir, that we are here merely to get information and to develop the advisability of the ideas that are suggested from time to time. Now, what I want to get at is this: The nature of the lesions that he spoke of that have been recently suggested, which have a clearly established connection with the clinical history of pain and discomfort. He did not make that clear.

Dr. Mann.—I referred to the cases of Dr. Mary Dixon Jones, of Brooklyn. I have not verified them under the microscope, and only threw this out as a hint.

Dr. Polk.—I thought so.

Dr. Joseph Taber Johnson, of Washington.—I have listened with great interest to the paper, and to the remarks of Dr. Polk. My experience in nearly one hundred laparotomies does not bear out the correctness of the suggestions made by Dr. Polk. In regard to our efforts to yield to the widespread demand, among general practitioners at least, that "this wholesale onslaught on the ovaries should cease," and that we should simply break down adhesions, leaving the ovaries and the woman "without mutilation and unsexing," I would say that I have in a number of cases

broken up the adhesions which seemed to be the greater part of the trouble, where the results of former inflammation had bound the pelvic viscera together. In several of these cases I have not removed the ovaries, or only one which was more diseased than the other. In two cases the patients were relieved for six months, and I thought that they were cured, but the trouble returned, and they became worse than before, so that it was necessary to perform a second operation. In this second operation the other ovary, which had been left, was removed, and since then they have been perfectly well. I believe that if the ovaries had both been removed the first time, when the adhesions were broken up, the patients would have been cured by the first operation. Leaving one was entirely on account of yielding to the expressed wish of the physician present, who said: "Don't remove the other ovary; break up the adhesions and she will be all right." But the subsequent condition after a few months was worse than before. The second operation had to be done in order to relieve her from adhesions, made worse by the first operation. I think that the condition is made worse sometimes by breaking up these adhesions, resulting in shorter bands than in the first place, and binding the viscera closer together than before. You remember the teaching of Thomas and Goodell, that where the abdomen was opened, and there was the slightest suspicion of disease in the other ovary, that should be removed also. In these two cases, and in two others in my experience, it was necessary to perform a second operation to remove the ovaries which had been left; on account of the patient being a young woman, we thought it was a pity to remove them both. So, from my experience in these four cases, I have come to feel that if there is much disease it is better and safer for the patient to have the other ovary out, than to leave her subject to this repetition of invalidism and the dangers of a second operation.

Dr. Polk.—There is no question, Mr. President, of the justness of Dr. Johnson's comment. It is exactly in the line of my own experience, but does not invalidate the position which I wish to suggest to the Society; on the contrary, it strengthens it, for the reason that it makes it necessary for us to examine the additional ovary with great care, and unquestionably if there is multiple

cystic degeneration of any extent it is unwise to leave it. A second operation has been made quite as often in tubal disease for the tube which was left behind. I am sure, however, that we have many ovaries in which there are but one or two good-sized cysts, which we can enucleate after the manner of Schroeder, and the adhesions that result will amount to very little. It is not necessary in these cases even to make use of sutures for the purpose of closing the incision in the ovary. I merely spoke of sutures in my case, because it was done to control hemorrhage from the cut ovarian surfaces.

In regard to the history of adhesions, that is a matter which we have as yet not fathomed. We know that in some cases adhesions may exist forever, but they are not always a matter of great importance. I think that we have all opened the abdomen a second time and found to our surprise no remnant whatever, or at best but one or two small bands, showing the lines along which the drainage-tube rested probably five or six days after the primary operation. Therefore we must give the patient the benefit of the doubt concerning these adhesions, as well as the benefit of the doubt in the other directions mentioned.

Dr. Ashby.—In closing, I would only say that I regret that Dr. Kelly has not given us a better title for the paper than laparotomy for pain.

Dr. Kelly.—My remarks referred to the contents of the paper rather than to its title.

A CASE OF INCONTINENCE OF URINE DUE TO MALPOSITION OF THE URETER.

By F. H. Davenport, M.D.,
Boston.

Mrs. W., twenty-nine years old, married, three children, was brought to me by her physician December 11, 1889.

She gave the following history. She had suffered from incontinence of urine all her life, being constantly wet, and as a consequence debarred from society, and practically confined to her own house and immediate neighborhood.

Close questioning revealed the following facts: The leaking was very constant, not being affected by position, time of day, or special expulsive efforts, like straining or coughing. The amount varied, however, within certain limits, as shown by the number of napkins required, sometimes two or three a day being sufficient, while at other times six or eight were necessary. There was more just before she was unwell and when she was pregnant. Urine collected in the bladder and was passed at normal intervals, but leaking occurred almost immediately after the bladder was emptied. There was no history of a gush of urine followed by a period of quiescence. Cystitis was absent, and her physician assured me that her urine was normal. He had tried in many ways to effect a cure; belladonna, and nerve tonics, electricity, rectifying a malposition of the uterus, and injecting water into the bladder to enlarge its capacity up to eighteen ounces. All these measures had been absolutely fruitless.

The examination in the dorsal position did not reveal anything except that there was a sense of unusual thickness of the anterior vaginal wall, appreciable to the examining finger; nothing abnormal was noticed about the meatus.

On the introduction of the speculum in Sims's position a peculiar ridge of the mucous membrane was noticed on the anterior wall, a little thicker than a lead-pencil, convoluted, and perhaps two inches in length. It ran from just below and to the right of the cervix, and ended about half an inch back of the meatus, a little to the right of the median line. This was commented on at the time as an unusual appearance.

Attention was now directed to the meatus, from which apparently urine was slowly dropping. When it was remembered that the patient had passed urine just before the examination, and that she was lying in Sims's position, it seemed at once evident that it was not an ordinary case of incontinence. On closer inspection it seemed as if the urine instead of coming from the urethra came from a point just on its edge and below it. Here there was a heart-shaped papilla, at the apex of which there was a small dark spot. To determine the source of the urine the lower portion of the urethra was plugged with a pledget of absorbent cotton, when it was found that urine still issued from this papilla. A fine probe was now tried, and an opening was discovered, just at the black spot described above, which admitted the probe to the depth of half an inch. Its farther progress was arrested by a depression in the vaginal wall, just beyond which the convoluted ridge began. Pressure made upon this ridge from behind forward caused urine in increased amount to drop from the opening.

The chain of evidence now seemed to be clear that we had to do with a malformation of the ureter, by which, instead of turning into the bladder at its normal place, it was continued along in the septum between the bladder and vagina, and emptied by a special opening near the meatus. This hypothesis very satisfactorily explained the train of symptoms observed in this case. I was the more ready to accept this diagnosis, as I had in mind a case reported some years ago by Dr. W. H. Baker, where a precisely similar condition of things was found, and was successfully operated on by him. This case will be referred to later.

The indication in this case was if possible to dissect up the ureter from its bed in the anterior vaginal wall to a point corresponding to where it would normally enter the bladder, make

an opening into the bladder, turn the ureter in and fasten it there, and then close the fistula.

The operation was performed on February 11, 1890. In the Sims's position the field of operation was well exposed. The ridge presumably containing the ureter was incised across at its anterior extremity, and in the middle of it was easily found a lumen of considerable size. A probe could now be easily passed four inches, and with careful manipulation probably more. Its direction was through the convoluted tube, which straightened out as it passed, then, half to three-quarters of an inch anterior to the cervix, it curved around to the right, following the direction of the normal ureter. Thus all possible doubt as to its nature was set at rest. As the ureter below its normal opening-place into the bladder was not imbedded in the vaginal wall, but lying on it, as it were, it was an easy matter to dissect it up from its bed. When this had been done for a distance of about two inches an opening was made into the bladder. The vaginal surface of the ureter was refreshed for about half an inch from the bladder end, and the superfluous end cut off. Two catgut sutures were then passed through the thickened walls of the ureter, and through the bladder membrane and tied. The fistula and denuded bed of the ureter were then closed with silver wire sutures, care being taken to include a good deal of tissue over the fistula and ureter.

Directions were given to evacuate the bladder every four hours with a glass catheter, increasing to five or six after a few days.

There was apparently no leaking for several days after the operation, but there was soon evidence that perfect union had not been secured, and an examination with the speculum by the attending physician revealed the existence of a small fistula near the point of insertion of the ureter into the bladder.

A secondary operation was therefore done March 11th. On close examination it was found that the ureter had retracted so that its free end was lying in the vaginal septum instead of within the bladder. The ureter was dissected still farther out from the vaginal wall, and a considerable area of vaginal mucous membrane denuded on each side and above. A fistula was

made and two catgut stitches passed through the ureter and bladder mucous membrane, as in the preceding operation. In order to push the free end of the ureter well through into the bladder, the vaginal mucous membrane was folded transversely instead of lengthwise of the vagina, thus shortening somewhat the length of the anterior vaginal wall, and numerous silver wire stitches were used, care being taken not to compress the lumen of the ureter.

This last operation was a complete success, the parts uniting perfectly, and for the first time in her life the patient was able to keep herself dry.

The report of Dr. W. F. Whitney on the portion of supposed ureter which was cut off at the first operation, is as follows:

"A piece of tissue three and one-half centimetres long, traversed by a canal, lined with a membrane slightly folded on the inside. Microscopic examination showed it to be in general fibrous tissue, and that the lining membrane was made up chiefly of somewhat flattened cylindrical epithelial cells. The structure was similar to that of a ureter."

As a matter of secondary interest it may be well to mention that on exploring the bladder with the finger a polypus was found hanging from the upper bladder wall, about the size of a grape, and with a very small pedicle. It was left, as I did not desire to complicate in any way the success of the operation.

The first point of interest in this case is the extreme rarity of the affection. Dr. W. H. Baker in 1878 published[1] the account of a case almost the counterpart of this, and was at that time able to find the report of only one similar case, the records of which were found in the Boston City Hospital. It did not, however, come to operation. Dr. Baker also referred to a case of Dr. T. A. Emmet's at the Woman's Hospital in New York, where one of the ureters ended in the upper part of the vagina beside the cervix uteri.

[1] New York Medical Journal, December, 1878.

A somewhat careful study of the literature of the subject since Dr. Baker's paper was published, reveals only one case which is at all analogous. Dr. von Massari[1] reports a case where there was atresia ani at birth, which was operated on with partial success. When the girl was four years old, a secondary operation was undertaken for the purpose, if possible of giving the patient complete control of the sphincter. At that time some dribbling of urine was noticed. Death followed the second operation; and the autopsy showed a single kidney formed by the fusion of the two, the right ureter normal, the left contracted in places by cicatrices, and passing along the anterior wall, and ending in a fold of the vulva with a very small opening.

Other abnormalities of the ureter, such as double ureter either for a part or the whole of their course, but opening normally into the bladder; absence of upper two-thirds of left ureter, lower third developed; atrophy of left kidney, left ureter ending in a walnut-sized tumor projecting into the bladder; these and similar changes have been described, and are of interest in this connection, though of very different significance.

The latest works on pathological anatomy refer to the possibility of an abnormal course of the ureter, but do not mention this particular malformation. The fact that two such cases have been observed in the same locality within a period of twelve years, would be at least presumptive evidence that they are not so rare as the paucity of records would lead us to believe. Possibly a closer study of some of the intractable cases of incontinence of urine would bring to light more of these anomalies.

As regards the technique of the operation, I made a mistake in my first trial in cutting the ureter off too short. In dissecting it out from the vaginal septum, it was unavoidably drawn upon, and while I left at least an inch of free ureter to

[1] Wiener med. Wochenschrift, No. 33, 1879.

be turned in, yet it undoubtedly contracted to half that length when the traction was let up, and the end did not project sufficiently into the bladder.

In the case reported by Dr. Baker a calculus formed in the bladder, which necessitated an operation for its removal. In all probability one of the stitches used to attach the ureter to the bladder wall was the nucleus. In spite of my knowledge of this fact, I did not dare to omit these sutures in my operation, but I chose catgut, and used only two, hoping that no trouble would follow. A few days ago I saw Mrs. W.'s attending physician, who told me he feared a calculus was forming, as she had some vesical disturbance, and had once or twice passed blood. In another similar case I should omit those sutures altogether, or use silver wire just avoiding the bladder mucous membrane.

DISCUSSION.

Dr. H. T. Byford, of Chicago.—I would state there is another case on record of the ureter opening into the vagina, which was reported by Dr. L. L. McArthur before the Illinois State Medical Association, upon which he operated successfully.

A CASE OF RUPTURED TUBAL PREGNANCY.

By Charles Jewett, M.D.,
Brooklyn.

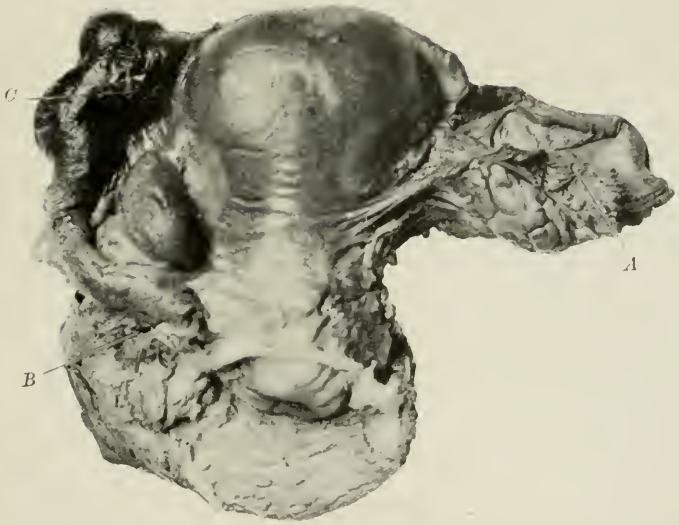
The following case occurred in the practice of Dr. F. A. Jewett, about three weeks ago. The patient, aged twenty-nine years, single, was first seen by him on the evening of August 22, 1890. She gave the following history: At the last menstrual period she had only a slight show, lasting but one or two hours. The suppression she attributed to a bath taken the day before the flow was due. There had been no subsequent hemorrhage, nor had there been any pain. August 22d, while at dinner, she was seized with an attack of syncope. To such attacks, however, she was subject. On regaining consciousness she complained of general abdominal pain, which seemed to radiate from a point near the median line above the umbilicus. The abdomen was somewhat tender on pressure and slightly tympanitic. Vomiting occurred repeatedly during the night. The case was now seen by Dr. I. H. Barter, and two or three times subsequently. Morphine was freely used for the control of pain. August 23d, A.M., sharp colicky pains in paroxysms recurring at intervals of about two hours. Stabbing pains every one or two minutes during the intervals between the colicky paroxysms. In the evening of the 23d pains had been relieved by morphine, hypodermically; abdomen still tender on pressure; pulse 96. During the night of the 23d the pains were for the first time referred to the pelvis, and radiated down the thighs. Slight flow of blood from the vagina. As the catamenia were due on the following day the pains were taken to be dysmenorrhœal, though more severe than her usual attacks. Up to this time there had been no marked pallor nor other striking sign of internal hemorrhage. August

24, 10 A.M., pulse 120; temperature 100.4°. The patient went into collapse at 11 and died at 2 P.M., before she could be seen again.

Autopsy by Dr. C. E. Barber. Abdomen full of blood. Omentum attached to the fundus uteri by recent adhesions. Left ovary partially prolapsed and fixed to the uterus by old, firmly-organized adhesions, just without the left fold of Douglas. The right side of the pelvis posteriorly also showed evidences of old pelvic peritonitis. The isthmus of the left tube contained a gestation sac of about five or six weeks' development. The tube had ruptured at a point three-fourths of an inch from the cornu, near the middle of the posterior aspect of the tube. The elliptical opening measured four millimetres in length. The ovum still remained *in situ*. The specimen when examined by me had been for three weeks in 30-per-cent. alcohol. The length of the uterus externally was three inches; width, between the insertions of the tubes, one and three-fourths inches; greatest thickness, one and a quarter inches. The os externum barely admitted a common lead-pencil. The cavity was somewhat enlarged and contained a decidual cast, nearly detached.

The case is of interest in connection with the question of diagnosis. Prior to the rupture there was absolutely nothing in the history that could have excited more than a suspicion of extra-uterine pregnancy. It is extremely doubtful if a careful pelvic examination at that time could have discovered the real character of the case. The os was very slightly open and the only mark of uterine enlargement was a moderate bellying of the body anteriorly. This and the beginning expansion of the tube would hardly have sufficed to determine the true state of affairs, surrounded as they were by the marks of a former pelvic inflammation. After the collapse, the diagnosis should have been made, but the patient was not seen at that time.

Before the collapse several circumstances combined to mislead; only an exploratory incision could have settled the question at that time. So safe and simple a procedure is this



A. Pavilion of right tube

B. Pavilion of left tube.

C. Site of rupture.

in competent hands that it should not be omitted in the presence of a well-founded suspicion of beginning rupture.

The accompanying photograph of the uterus and appendages made after the specimen had been three weeks in dilute alcohol, shows the relation of the parts.

SUPRA-VAGINAL AMPUTATION OF THE UTERUS FOR LARGE FIBRO-MYOMATA COMPLICATED WITH PREGNANCY.

Report of Two Cases.

By J. H. Etheridge, M.D.,
Chicago.

The diagnosis of pregnancy in cases of large uterine fibro-myomata is a very uncertain matter. Prolonged watching of such cases will oftentimes enable the physician to make a correct diagnosis. The ordinary subjective and objective symptoms of pregnancy, together with the rapid growth and the increase of the compression symptoms on the part of the abdominal and thoracic organs, will oftentimes facilitate the diagnosis of this complication. The acceleration of the growth of the tumor and the rapid increase of the compression of the abdominal and thoracic viscera to the point of danger, urge the surgeon to interference. Whenever the diagnosis of pregnancy in large fibro-myomata of the uterus can be made the surgeon is brought to face an emergency which demands the clearest perception of his duty. Only two courses are open for him to pursue—*premature delivery* or *supra-vaginal amputation*. He cannot allow the case to go on, because without interference the death of the patient is certain to follow.

Premature delivery is attended with disproportionately greater danger, because of the non contractility of the uterine tissue, and because of the possibility of puerperal degeneration of the tumor following, and of the possibility of uncon-

trollable hemorrhage from the placental site. The tortuosity of the uterine canal, which commonly exists, makes the possibility of delivery by artificial means so problematical, that to interrupt a pregnancy for the purpose of premature delivery would almost surely result in death. For these reasons extirpation of the tumor is decidedly preferable. Supra-vaginal amputation in these cases is also indicated for the reason that the possible outcome of the operation is rendered perhaps more favorable on account of the increased yielding character of the cervix and ligaments.

It is unnecessary to mention the rarity of two cases of large mural fibroids complicated with pregnancy, falling under the care of any one physician.

Case I.—Mrs. A. B., aged thirty-four years, married several years, childless, experienced uterine symptoms four years previous to the time of operation, which her medical attendant, Dr. Knox, of Chicago, recognized as due to a uterine retroversion, and which he treated with a pessary for six months. Six months later he discovered a small uterine fibroid, whose growth he watched until she was subjected to operation. In May, 1886, the Doctor was summoned to attend her for a distressing nausea; at the same time the menses, which had never been excessive, ceased. The ordinary mammary changes of pregnancy supervened. In the ensuing three months the tumor grew rapidly. The decision was reached that pregnancy was present, and the Doctor awaited the expiration of the first three months to produce an abortion. Accordingly, on August 1, 1886, he introduced a sound into the uterus four inches. Its withdrawal was followed by a small amount of blood, the nausea and vomiting ceased, and the mammary changes disappeared. Nothing further ever followed indicating the previous existence of pregnancy or an abortion, and the conclusion was reached that possibly she was not pregnant. The rapid growth of the tumor, encroaching upon the abdominal organs, interfering with their function, was progressively killing her; her strength had greatly diminished, emaciation was progressive, and she had taken to her bed because the slightest exertion put her out of breath.

At this time I saw the patient. From external examination it was found that the tumor extended from the right iliac fossa across the entire abdominal cavity in a straight line to the spleen. Its length was apparently double or treble its width. It was freely movable, free from adhesions and solid. It presented great tenderness in the right iliac fossa. Digital examination showed the cervix uteri very high up, almost out of reach, in the left iliac fossa, and the fundus uteri was turned, apparently, abruptly into the right iliac region. The whole tumor moved with the uterus. A very slight resiliency offered to conjoined manipulation led to a diagnosis of possibly existing fibro-cystic tumor of the uterus. The sound was with difficulty introduced into the cervix, and it seemed to pass toward the umbilicus.

Examination of the bladder showed that it was not enlarged nor drawn up out of the pelvis by the growth of the tumor.

The ordinary preparations for laparotomy were made and the operation was performed on August 8, 1886. The abdomen was opened by a six-inch incision, extending from above the umbilicus to near the pubes. The tumor was found wholly free from adhesions; it extended to and encroached upon the spleen; it was oblong, its length being about treble its width. It was situated obliquely across the whole abdominal cavity. Its upper end was turned out of the abdomen, and the whole mass lifted out of its bed. Its smooth red surface nowhere indicated the line of the uterus; its lower end seemed to be one solid mass of pedicle, extending completely across the whole pelvic brim. The laminæ of the broad ligaments were separated in the most conspicuous manner. The two ovaries were attached to the mass on a level with the umbilicus, having been lifted completely up into the abdominal cavity.

After buttonholing the capsule of the tumor as low down as was practicable, it was peeled off as far as the finger could reach right and left, and ligatured in small masses in two places an inch or more apart and then divided between the ligatures. In this way all the capsule that could be secured in ligatures and cut was soon treated, and the hemorrhage from the operation was barely worth mentioning. The right uterine artery, which was much enlarged, was torn across and quickly secured. The sper-

matic and remaining uterine arteries were secured with double ligatures. Thus the apparently large pedicle was much reduced in size and was found to be about equal to the normal *corpus uteri*.

Around this mass was placed a Koeberlé's serre-nœud, which was properly tightened and the tumor excised. The small vessels were easily secured. The clamp was then slowly loosened, and the vessels of the stump tied.

The cervical canal was caught up with a vulsellum as tautly as possible and excised for the length of at least one inch. The piece removed was cone-shaped, with its base upward. The uterine canal was cauterized with carbolic acid. The peritoneum was sewed tightly over the top of the stump, the ligatures being tied as tightly as they could be drawn. After further bleeding vessels were secured in the usual way the abdomen was closed with nineteen stitches.

The patient rallied from the operation in a few hours. For a period of four days afterward she had a most intractable vomiting. This troublesome symptom slowly diminished and gradually disappeared upon rectal feeding, but not until the patient's face presented a little pinched condition.

After the operation, she never had an alvine dejection. Flatus passed only after the colonic distention permitted it, through a rectal tube. Repeated efforts were made to secure defecation, without result.

At no time after the operation did she have chill or sweats. The weather was intensely hot, and it was necessary to fan her continuously and to permit her to dabble her hands in cold water in a bowl placed at her side. She lived until the eleventh day.

The autopsy, made thirty-two hours after death, revealed a pelvis filled with fluid consisting of blood and pus. The small intestines were agglutinated over the pelvic inlet, almost hermetically. The surfaces of the small intestines turned toward the cavity of the pelvis presented a condition of sphacelous appearing degeneration. The pelvic cellular tissue was completely honeycombed with pus cavities. The stump presented a shrunken appearance, as though all of the stitches had been loosened, yet no pelvic fluid had found its way into the vagina through the

cervical canal. The patient had succumbed to septicæmia. I regret that I did not treat the pedicle extra-peritoneally and drain.

Examination of the tumor revealed the fact that it was a multilobular fibroma, and that it grew from the anterior wall of the *corpus uteri*. The cavity of the uterus was found on a level with the umbilicus, and contained a three months' fœtus in unruptured membranes, evidently alive up to the time of operation. The cervical canal was 5½ inches long, which fact explains the immunity of the membranes from puncture by the introduction of a sound only four inches. The canal resembled the letter U, with its legs pulled apart; starting from the extreme left iliac fossa at the *os uteri*, it passed toward the umbilicus two inches, and was then deflected at an obtuse angle toward the spleen.

Upon laying open the uterine cavity, it was found to be in appearance a cavernous hollowing out of the posterior surface of the tumor. In front of it was nearly the whole width of the tumor. Its posterior boundary was a wall of uterine tissue, thinner than the normal unimpregnated posterior uterine wall. It was situated in the middle of the tumor. The membranes presented a leaden-grayish appearance, and were filled with fluid.

The fœtus was a male. Its cord was seven inches long and was normally attached.

Microscopic examination of the tumor showed its character to be purely fibromatous. Its weight was about ten pounds.

Case II.—Mrs. C. D., aged forty-three years, married nineteen years, had one child seventeen years ago. She had not menstruated for three months, and the mammary areolæ had grown darker. The effects of the pressure of the tumor were showing themselves in a progressively impaired digestion.

Examination of this patient revealed the fact that she had a large uterine tumor, which filled the whole of the lower portion of the abdomen. It was freely movable. The sound could be introduced to the depth of three inches.

There was nothing to call attention to the existence of pregnancy in this case, beyond the fact of the cessation of the menses, which was, perhaps, for the time being accounted for by the possible change of life.

The operation was performed in Minnesota, May 5. 1889.

The patient was prepared in the ordinary way for laparotomy, and an incision seven inches long was made, through which, with great difficulty, the tumor was forced outside of the abdomen.

The base of the tumor seemed to extend from one side of the pelvis to the other. The laminæ of the broad ligaments were greatly distended, but were comparatively easily compressible with the hand.

Deep sutures were taken as far down into each broad ligament as a needle could be made to sweep, about half an inch apart, and the broad ligament was tied off on either side, thus diminishing greatly the base of the tumor, which was found to be about co-equal with the size of an ordinary unimpregnated uterus. Around these an elastic ligature was placed and tightly drawn. All small bleeding vessels were then secured, and immediately under the elastic ligature was placed a Tait clamp, which was fastened with great care. The tumor was then excised, and when it was about half accomplished, the foot of a fœtus descended from the mass, at once revealing the fact of the existence of pregnancy. Its presence before was not even suspected.

As soon as the tumor was entirely removed the clamp was still further tightened, and the rubber ligature removed. While finishing the toilet of the peritoneum, the stump slipped out of the clamp partially and a frightful hemorrhage occurred, which was enough to strike terror to the bravest heart, showing that the large arteries had not all been secured in the ligatures. The clamp was quickly readjusted, all further needed ligatures applied, and the incision was closed about the stump. The stump was completely hidden from sight with the free use of iodoform, the ordinary binder was applied, and the patient put to bed.

Scarcely any noteworthy symptoms occurred, the patient going straight on to recovery, shedding the clamp on the nineteenth day. For several months afterward a little suppurating sinus remained, which was subsequently treated with antiseptic injections and eventually closed. The patient is to-day in a fair condition of health.

The tumor removed weighed nineteen pounds. Both ovaries were attached to the tumor and had been lifted up into the abdominal cavity upon a level with the umbilicus. It was a multi-

lobular myofibroma. Dissection of the tumor revealed the fact that it seemed to grow from the whole of the *corpus uteri*. The cavity containing the membranes with its fœtus was about in the centre of the whole tumor. Upon bisecting the tumor from below upward, the membranes were easily separated from the endometrium, and a well-formed male child of about four months was revealed. The cord was about nineteen inches long. It was evidently living at the time of the operation.

The accompanying plates show the various points of interest of the tumor and its contents.

Plate I., Fig. 1 is a view of the tumor from behind, showing the two ovaries, both enlarged, and several minor coexisting subperitoneal fibroid tumors.

Plate I., Fig. 2 shows the tumor bisected from side to side, with the membranes unruptured, *in situ naturalis*.

Plate II., Fig. 1 shows the membranes divided, their upper flap turned upward, exposing the fœtus in its natural position undisturbed.

Plate II., Fig. 2 shows the fœtus lifted out of its bed, with the funis exposed in its whole length.

Remarks.—Supra-vaginal amputation of the uterus for large fibroid tumors has recently received a great check through the claims made for electricity. But I cannot believe that this agent can do anything but harm in fibromyomata complicated with pregnancy. Should electricity be used in such cases the probability is that the death of the fœtus would ensue, and then the very alarming disaster of fatal sepsis, which would speedily follow, would be inevitable.

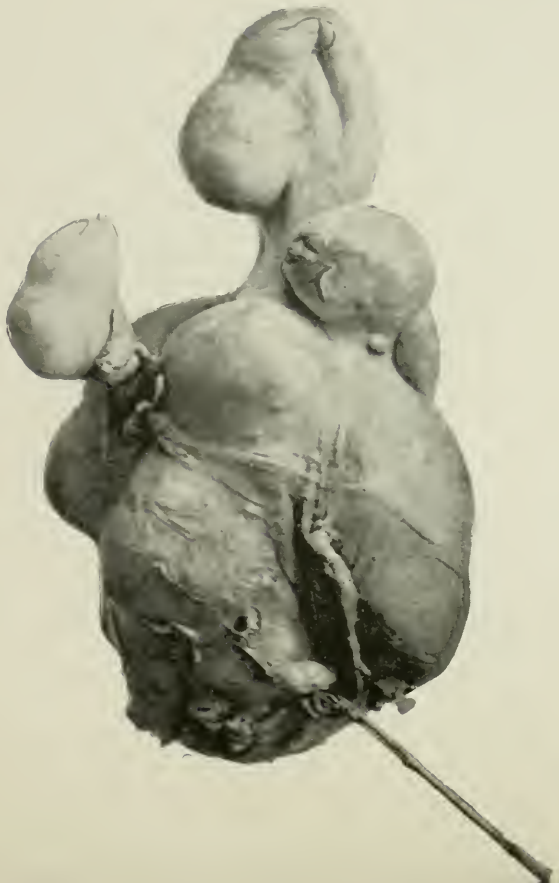
Where the slightest reason occurs to suspect the presence of pregnancy in mural fibroids, the most minute and careful watchfulness of the case is necessitated, for I cannot see how any other treatment than supra-vaginal amputation can save the patient, myomectomy being out of the question.

It would seem, in view of the dangers of abortion, which are undeniably enormous, that supra-vaginal amputation of this class of tumors is incontestably demanded.

Fig. 1.

PLATE I.

Fig. 2.



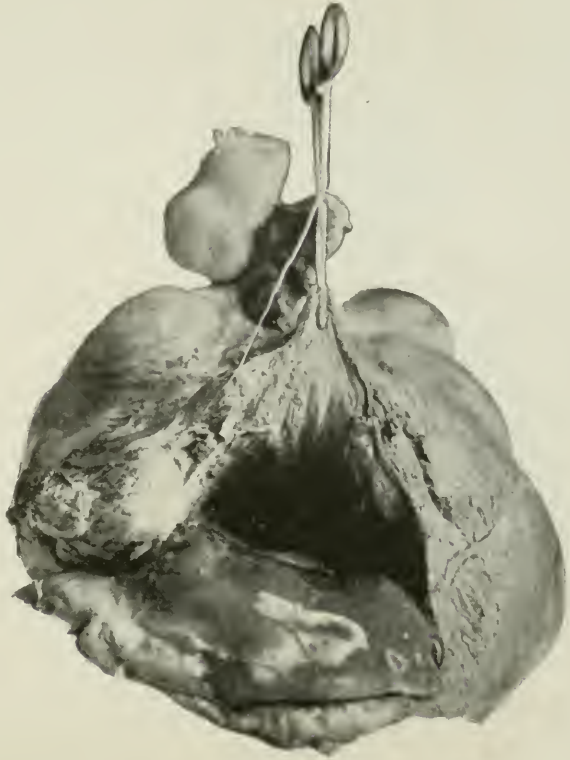
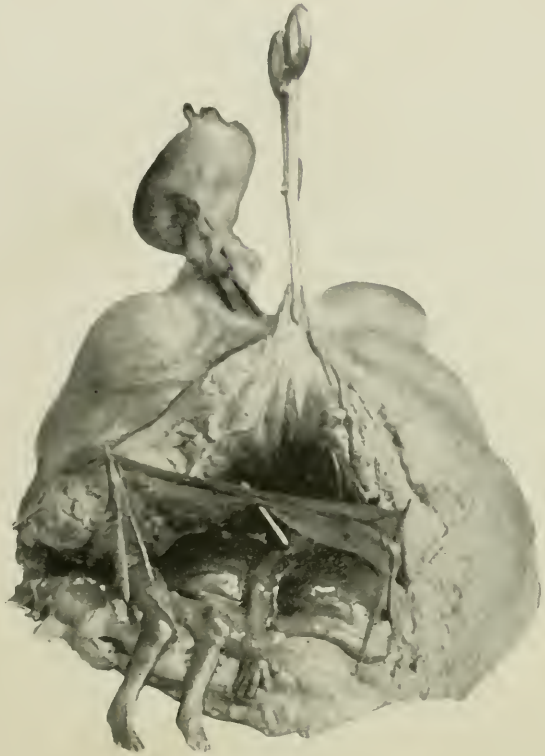


Fig. 1.

PLATE II.

Fig. 2.



The treatment of the stump with a clamp is not without its dangers. I once had the appalling disaster occur of having the shorter end of a Tait clamp slip into the wound fifteen hours after operation for the removal of a forty-two-pound uterine fibroid. The ends of the clamp, if one be used, should extend to each iliac crest.

The treatment of the broad ligaments by long-jawed snap forceps adjusted from above, with the jaws protruding into the vagina below, the handles remaining above the abdomen, after detaching the vaginal connection with the uterine cervix and removing the uterus in its entirety, has been performed by Dr. Denslow Lewis, of Chicago, in two cases of removal of uterine fibroid, with recoveries. Where such treatment of the broad ligaments can be accomplished with the certainty of avoiding the ureters, we can have the certainty of absolute drainage.

THREE CASES OF PLACENTA PRÆVIA CAUSING ABORTION.

By Robert A. Murray, M.D.,
New York.

Hemorrhage, as a symptom of placenta prævia, usually does not come on until about the sixth month of pregnancy, is the statement of most of the standard obstetric works. I have, however, seen several cases after an abortion had taken place, the cervix still being patulous, where the examining finger introduced to determine if the uterus were thoroughly emptied detected the site of the placenta in the lower cervical zone.

During the last three years, three cases came under my care in consultation, in which persistent hemorrhage and absence of the ordinary signs of pregnancy led to difficulty in diagnosis and demonstrated the inefficiency of the ordinary treatment.

A brief history of these cases will form the basis of some remarks as to the diagnosis and treatment of this complication of pregnancy.

Case I.—Mrs. G., aged twenty-eight, II-para, married about eight years, the two pregnancies having been in her first four years of married life, and with normal menstrual history, was brought to me by Dr. H., who stated that for four months she suffered with metrorrhagia, commencing in moderate amount, but later on becoming so profuse that confinement to bed, the use of cold, and the tampon had only temporarily checked it.

There was no morning sickness, but little tenderness at the

side of uterus, and the enlargement of the womb had suggested to his mind the presence of a tumor rather than pregnancy.

On examining bimanually, I found the uterus enlarged to about the size of the fifth month of pregnancy, the cervix flabby, œdematous, slightly patulous, and the lower segment of uterus larger and fuller than natural. There was a profuse bloody discharge, which had rendered the patient very anæmic.

As the age of the patient and the history, with the smooth, rounded surface of the uterus, precluded the idea of fibroid, and the tenderness and hardness of the pelvic peritonitis being insufficient to explain the constant hemorrhage, I made the diagnosis of placenta prævia, and advised the immediate emptying of the uterus.

Two small tupelo tents were passed into the cervix through the os internum, and the vagina firmly tamponed with iodoform gauze, at about 10 P. M. This started up some pains during the night, and effectually restrained hemorrhage.

At 7 the next morning the tampon was removed, an antiseptic injection of carbolic acid was given, and, the os uteri not being dilated more than the size of a lead-pencil, the tupelo tent and tampon were again introduced, and half-drachm doses of ergot (fl. ext.) administered every two hours till 12 M., when, the pains being forcible, the tampon and tents were removed; the cervix was dilated so that the finger easily felt the placenta attached all around the os internum; the placenta was detached by the finger, removed, with the small fœtus, by Simpson's placenta forceps, and the uterus thoroughly washed with carbolized hot water. The after-treatment was vaginal injection of hot carbolic lotion, 1 : 100, twice a day, and the use of the aseptic pad of mercuric bichloride gauze, 1 : 2000. Convalescence was uninterrupted, and in two weeks there could not be detected any exudation or tenderness in the pelvis.

Case II.—Mrs F., aged thirty-two, whom I had attended with difficult labors twice during the previous five years (three years from the last confinement), came to me from the country, complaining that she had for four months a steady flow of blood from the womb, but very little pain. Her physician had become alarmed at the persistence of the metrorrhagia in spite of the

use of the ordinary means, as rest, cold, mineral acids, etc., and as no nausea or other symptoms of pregnancy could be elicited, determined that she must have a tumor, and that treatment for it and the hemorrhage was necessary.

The patient was extremely anæmic, short of breath, having sudden attacks of syncope, and exhibited all the evidences of great loss of blood. I made a vaginal and bimanual examination; found the os uteri patulous, enlarged, œdematous; the lower zone of uterus much enlarged; the uterus of the size of the fourth month of pregnancy, and the finger being passed with difficulty into the cervix, felt the placenta attached to the margin of the os internum.

The vagina was thoroughly plugged with a bichloride gauze, as the bleeding was severe and the patient fainted; she was then removed from my office to a friend's house, and restoratives and ergot given.

Recovery of strength was such that in six hours I determined to remove the tampon and clean out the uterus to arrest the flow absolutely. I found the cervix more patulous, and distended so that the finger could be introduced; the placenta was quickly detached; the placenta forceps removed it first, then the fœtus, the uterus was cleansed by a hot carbolic injection, which also caused it to contract, the uterus being grasped by the hand outside, and, by pressure, its relaxation controlled, as the patient did not seem able to lose a drop more blood.

Fluid extract of ergot was given in a drachm dose, and stimulants and heat to extremities, with absolute rest, caused the pulse to become slow and steady. The temperature, which had been 103°, fell in two hours to normal, and the patient made a sure, but slow, convalescence, on account of the loss of blood. No septic symptoms were ever present.

Case III.—The third case is unique in my experience, since it was a first pregnancy, and the patient had an exceptionally good menstrual history.

Mrs. F., aged twenty-two, married six months, always regular, no pain, except at commencement of menstrual flow for about two hours; no observable leucorrhœa. In April, 1889, when two and a half months married, began to lose blood when she

walked, particularly when shopping, as she then stood a great deal. This flow continued, becoming at times greater; these periods I found to be at what she termed her menses.

She had no nausea, morning sickness, pain in the breast, nor any subjective symptoms of pregnancy.

On the night of the 25th of April she suddenly had a profuse flow of blood, which awoke her; no pain ensued, but a fainting attack. I was called immediately, and found her in a very nervous condition, with cold extremities, small, rapid pulse—120, respirations frequent. The flow had now ceased, but the appearance of the bed and her clothing indicated that it had been very abundant. After restoring her circulation by restoratives and heat, and quieting her nervousness, a digital examination was made, the cervix found enlarged, swollen, and closed, the neck of the uterus was of normal length, the uterus enlarged to about the fourth month, the lower part of it softer than usual, the left side markedly so; no pain or tenderness elicited by pressure.

I diagnosed pregnancy, with probable placenta prævia, lateral implantation, and that an abortion was imminent after such a sudden and profuse hemorrhage.

I advised the tamponing of the vagina thoroughly, with the desire to restrain any further hemorrhage, and to allow time for the recovery of the patient, to be followed by dilatation of the cervix and emptying of the uterus. I tamponed thoroughly with gauze wet with alum solution; no further flow appearing, after two hours I left the patient.

In the morning, on removing the tampon there was no bleeding present, and the husband and mother of the lady refused permission to empty the uterus.

The patient rested for a week, during which there were only traces of blood; but on the tenth day, in the early evening, there was a moderate flow, followed in about two hours by a fairly profuse one. I again tamponed as before, and obtained permission to dilate the cervix to determine if I was correct, to be followed by clearing out the uterus thoroughly, if such operation seemed necessary.

I had explained to the husband the dangers that lay before his wife if the pregnancy was allowed to continue.

As the cervix in the morning when I removed the tampon seemed softer and the os slightly dilated, I introduced a small tupelo tent, after disinfecting the vagina, and again tamponed.

In the afternoon some pain came on, and on removing the tampon the os was found more dilated, but not sufficient to allow digital exploration. Two larger tupelo tents were now introduced, a tampon applied, and ergot given in twenty-drop doses every two hours.

At 9 P.M. I found the patient suffering sharp pains, with a sensation of fulness in the vagina. Removing the tampons I easily withdrew the two tents, which was followed by some blood. The cervix now admitted the finger easily, the placenta was found attached all over the os internum, but mostly on the left side; the right side was now detached, the membranes found intact, and by turning the finger to the left side the placenta was fully detached, the membranes ruptured, and the entire contents extracted by the placenta forceps quickly.

The cervix was not sufficiently dilated to withdraw the mass with the fingers, while the placental forceps, guided by the finger, did not bruise or grasp the uterine wall, and easily drew the mass away without adding bulk to it.

A hot intra-uterine injection cleansed the uterus, caused contraction, and the patient was left. No further hemorrhage occurred. Ergot was given at the time of operation, but not afterward. The patient's convalescence was rapid.

These cases differ very much in their histories from placenta prævia in the latter stages of pregnancy.

1. The history of pregnancy as given by the patient is wanting, the menses apparently persisting, nausea and vomiting not noticeable, though two of the patients had previous pregnancies and were familiar with the symptoms.

2. Pain was not a marked symptom, as in abortion ordinarily.

3. The hemorrhage was not sudden, except in the last case, and there had been previous flow.

4. In all the cases physicians who had treated many cases of abortion were misled by the symptoms. Many obstetric

authors put placenta prævia among the causes of abortion, but allege that there are no means of determining the condition in the early months of pregnancy. In view of the immense risk to the patient if the pregnancy continue, it seems we should discriminate, in cases where hemorrhage complicates early pregnancy, and not endeavor to continue the pregnancy, but immediately empty the uterus if the condition of placenta prævia can be determined.

Can we diagnose placenta prævia in the early months of pregnancy? I believe we can, almost always, if the following points are borne in mind:

1. Every hemorrhage intermenstrual should be carefully observed; a thorough digital bimanual examination of the uterus made, and by the aid of Hegar's sign of enlargement of the uterus, pregnancy can be diagnosed early.

2. The cervix, even early in placenta prævia, is more enlarged and œdematous than normally, oftentimes irregularly enlarged, one side more prominent, softer, more elastic to the touch, and this condition is felt passing up to the lower zone of the uterus, which is enlarged and fills more of the pelvis than it should.

3. The hemorrhage is painless, more persistent, and more abundant than in ordinary abortions.

4. The patients have usually had children, and generally with shorter intervals of rest between than ordinarily, and, therefore, more likely to have had endometritis and changes in the uterine mucous membrane inimical to the life of the ovum.

5. The age is usually younger than that at which fibroids develop, and the uterus is not irregularly developed, as is most often the case with fibroids.

The treatment, I believe, should always be the dilatation of the cervix by means of tupelo tents, or by the use of the tampon rendered aseptic; both of these measures generally are conjoined to restrain hemorrhage, and at the same time dilate the cervix. The tampon alone does not usually dilate

till much blood has been lost and great irritability of the vagina, bladder, and rectum excited; besides, as it has to be frequently renewed, and the blood is dammed back, pain and sepsis—the latter one of the greatest dangers—are favored. The above remarks also apply to the colpeurynter, though this can be used by any intelligent nurse to restrain hemorrhage.

When the cervix is dilated, the diagnosis is rendered positive, and the uterus should be emptied and cleansed.

The finger detaches the placenta on the side least attached, and the placental forceps, after the membranes are ruptured, easily removes the mass; the forceps, guided by the finger, under proper antiseptic precautions always, as the part pressed on will be the open mouths of the placental vessels in its site of attachment, I believe to be the safest instrument, and the smallest, as the cervix is not largely dilated.

The fœtal mass should never be left to come away by uterine pains, as the uterus acts very poorly, from immature development, and the mass, becoming septic, poisons the cervical segment in transit.

The uterus should always be cleansed, and made to contract by hot intra-uterine antiseptic douches, administered best by the double-canulated catheter; I have modified Fritsch's by enlarging it and changing the curve to more nearly the pelvic curve, but any good double canulated catheter will do.

In conclusion, the antiseptic pad and treatment should be used as thoroughly as in deliveries at term, for the peculiar site of placental attachment, the necessary manipulation, the loss of blood, all tend to cause sepsis and make it virulent.

The patient should certainly be kept in bed till involution is well under way, and till all peri- or para-metric disturbances, if any, are better.

ON THE FREQUENCY OF CONTRACTED PELVIS AMONG AMERICAN WOMEN, AS DEDUCED FROM 2227 CASES OF LABOR.

By Edward Reynolds, M.D.,
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The widespread incredulity of European obstetricians upon the alleged infrequency of contracted pelvis among American women, and their expressed opinion that its rarity is due to the almost universal neglect of pelvimetry by American physicians rather than to any national peculiarities of our native women, seems sufficient reason for the publication of any clinical observations which may have a bearing upon the subject, and the present report of 2227 cases of labor is intended as a contribution toward the settlement of this question.

The material upon which the paper is based consists of 100 cases confined in the wards of the Boston Lying-in Hospital, and 2127 delivered since May 1, 1886, in the Out-patient Department of the Hospital and the Obstetric Department of the Boston Dispensary.

These 2227 cases have furnished me with thirty instances of pelvic deformity, to which I have added nine drawn from my private and consulting practice; but since many different nationalities are represented among the patients of both clinics, it is necessary to classify them by nativity before attempting to draw any inferences from the proportion of deformity observed.

The amount and percentage of contracted pelvis, and its

distribution by nationality among the out-patients are shown by Table I.

TABLE I.

Nationality.	No. of cases.	Simple flat.		Generally contrated flat.		Justo-minor.		Naegele oblique.		Total.	
		No.	Per cent.	No	Per cent.	No.	Per cent.	No	Per cent.	No.	Per cent.
Jewish[1]	768	4	0.005	4	0.005	4	0.005	1	0 001	13	0 017
American . . .	581	0	.....	...	.....	2	0.004	...	.....	2	0.004
Irish	475	1	0.002	2	0.004	3	0.006	...	.....	6	0.013
English	72	1	0.014	...	.....	...	.....	...	.....	1	0.014
Scattering or unreported[2]	231	0									
Total . . .	2127	6	.....	6	.....	9	.....	1	.....	22	

21 of these 22 cases either occurred in my service or were seen by me in consultation with my colleague, Dr. C. W. Townsend, but to them should be added 2 cases attended by Dr. Townsend alone, and 2 delivered by Dr. C. M. Green, in each of which the record states that the measurements were taken but not preserved, as is shown in

TABLE II.

Nationality.	Pelvis.	Reporter.
American[3]	"Justo-minor."	Green.
Jewess	"Pelvis contracted."	Green.
Jewess	"Contracted pelvis."	Townsend.
Irish	"Contracted pelvis."	Townsend.

[1] These women are almost without exceptions Russians, Poles or Germans, who live together, are clinically indistinguishable, and are therefore grouped under one heading.

[2] The unreported cases formed the larger part of this class, and were, almost without exception, precipitate labors in which the whole report was incomplete.

[3] Included in Table I.

The value to be accorded to these results must depend largely upon their agreement, as regards the foreign patients at least, with the reports of European institutions; but in attempting a comparison we are met at the outset by the difficulty that, even in the German-speaking countries, where the subject has been most carefully studied, the reported results vary so widely (*e. g.*, 1.5 per cent., Hecker; 2.8 per cent., Winckel; 9.5 per cent., Pfund; 13.1 per cent., Michaelis; and 14.9 per cent., Litzmann) as to appear at first sight wholly irreconcilable with each other.

The discrepancy is, however, to be explained by a difference in the definition adopted for the limit of normal variation, since the authors who obtain the lowest percentages recognize as abnormal only those cases in which arrest occurred in pelves whose conjugates were less than three and one-half inches, while those who find the deformity most frequent admit to their tables all pelves whose conjugates are diminished by only 0.5 cm. (0.2 inch). It is, therefore, essential in reporting any series, to compare its results only with those which have been obtained by a somewhat similar rule. That which I have used, is that diminution of the conjugate to three and one-half inches with ample transverse space, or to four inches when accompanied by general contraction, is sufficient to constitute an abnormality.

My percentage among German-speaking patients (1.7 per cent.) would, therefore, be expected to correspond somewhat closely to those of Michaelis (13.9 per cent.), Litzmann (14.1 per cent.), or Pfund (9.5 per cent.); and the extreme discrepancy which in fact exists, is to be explained, partly, at least, by the fact that their tables were founded upon routine measurement of every case which came under observation, while in mine, only the operative cases were measured. It is, therefore, necessary, before instituting a comparison, to ascertain by computation the probable total percentage which which was present among my patients; and if to this end we accept the rule of Michaelis and Litzmann, that from 70 to

80 per cent. of pelves classified by such a rule will fail to obstruct labor, we must multiply the observed proportion (1.7 per cent.) by four, to obtain the probable total percentage, 6.8 per cent., which is even then much less than that obtained by any German authority who admits the lesser grades of deformity to his table.

A second point of interest in this inquiry is the proportion which obtains between the number of generally-contracted pelves found and the total amount of deformity observed. Here, again, the reports of foreign institutions differ widely (*e. g.*, 1.4 per cent., Winckel; 6.4 per cent., Müller; 22.3 per cent., Gonner; 50.0 per cent., Hugenberger; and 52.8 per cent., Bidder), but in these tables, also, the results depend upon the rule adopted, since the higher percentages are all reported by observers whose tables include only the more severe cases, while the results (1.4 per cent. and 6.4 per cent.) of those who adopt a more comprehensive definition are again widely different from my 61.5 per cent.

A closely similar difference in both respects seems to obtain between my results among the Irish and English, and those reported from their homes, although the accounts which I have been able to obtain from these countries are far less detailed than those published by the Germans; but if we turn to the native-born portion of the clinic, the decreased total deformity and the relative increase of general contraction become more striking yet when compared with the reports of European institutions; since the 581 American women furnished only two observed cases of deformity, and these both of the justo-minor type; a number which, by computation after the rule of Michaelis and Litzmann, would give a total proportion of only 1.6 per cent. of contraction; and, small as is the number of cases, the difference in the results is so striking as to demand further investigation.

The variation of the proportions observed among the foreign-born portions of the clinic from those of European hospitals, and their approximation to those obtained from the

natives, is probably due to the fact that a large number of these women, though born in Europe, were brought to this country during infancy or childhood, underwent the developmental changes of puberty here, and might, therefore, be expected to approach more or less closely to the characteristics of the native-born patients, especially as these latter were almost without exception of foreign parentage; but if this explanation is in reality sufficient to account for the discrepancy, and if it be true, as this investigation seems to suggest, that women of American birth are practically exempt from all but the justo-minor deformities, the same results should be obtained from the 100 cases observed in the wards, whose pelves were all measured; and it should also be found that all of the somewhat larger number of American pelves seen in consultation were of the same type.

TABLE III.

Nationality.	No.	Simple flat.	Generally contracted flat.	Justo-minor.	Total
American	57	..	...	1	1
Irish	27	2	...	...	2
English	3	1	...	...	1
Negresses[1]	8	1	...	...	1
Scattering	5				
Total . . .	100	4	...	1	5

The 57 native in-patients produced, as is seen in Table III., only 1 case of deformity, and that a typical justo-minor pelvis —the percentage (1.8) being closely similar to that obtained

[1] The occurrence of two flattened pelves [See Table IV.], both probably of rhachitic origin, among the small number of negresses delivered, and the absence of any well-marked rhachitic influence among the other cases, is in striking accordance with the statement of Bradford and Lovett [Orthopedic Surgery, chapter xix.], to the effect that severe rickets is seldom or never seen in this country, unless among the children of Southern Europeans, or among the negresses of the Northern States.

from the out-patients (1.6 per cent.)—while the few foreigners yielded 4 examples of flattened pelvis and no justo-minor; similarly, of the 4 deformed American pelves seen in private practice (Table IV.), 3 were justo-minor, and 1 a rare form of transversely contracted pelvis of somewhat similar etiological significance; but since this preponderance of symmetrical contraction might easily be ascribed to an error of observation, it seems best to describe briefly here the method by which the differential diagnosis was made.

TABLE IV.

Nationality.	Simple flat.	Generally contracted flat.	Justo-minor.	Robert's.	Total.
American	...	...	3	1	4
Negress	1	...	...	...	1
Irish	2	...	...	...	2
English	...	2	...	...	2
Total . . .	3	2	3	1	9

The tests by which a simple flat deformity was diagnosed were: That the presenting part entered the brim with its long diameter transverse, that its contact with the side walls of the pelvis was less close than with the symphysis and promontory, that the half-hand when introduced into the vagina for internal palpation, found the transverse space ample, that the external bis-iliac diameters were of nearly or quite normal length and the external conjugate diminished; but on the other hand, if the position was transverse, the degree of contact equal or nearly equal on all sides, the bis-iliac diameters decreased, though to a less extent than the external conjugate, the promontory low, the longitudinal curve of the sacrum increased, and the axis of the false pelvis, as a whole, short, the case was classified as generally contracted flat; while if the promontory was high, the sacrum straight and relatively long, the symphysis erect, the external diameters symme-

trically decreased, the sacro-iliac notches shallow, and the mechanism that of early flexion at the brim, the pelvis was considered to be justo-minor; and it may be said here that in all but one of the American pelves, these latter characteristics were well marked, while in that one case (Case 21), although the diagnosis was less clear, the weight of evidence seemed to point plainly to the justo-minor type.

If this classification be accepted as sufficiently exact for clinical purposes, I think that, so far as the number of cases warrants any deduction, it may be safely concluded that an American birth decreases the amount of pelvic deformity among the children of foreign parents, that the same result may perhaps be attained even by residence in this country during the early years of life, and that when such malformations occur among American women they are usually, if not always, of the justo-minor type. That pure-blooded American women are not wholly exempt from this evil is, however, shown, if proof be needed, by the fact that two of the contracted pelves seen in consultation were observed in women who were of long American descent, and distinctly of the upper classes of society; and, finally, if it is true that flattened pelves are the result, as a rule, of insufficient nourishment or excessive labor before or during puberty, while the justo-minor deformities are due to simple arrest of development at that period (that is, to a partial persistence of the infantile type), and are, therefore, independent of such conditions, the result obtained is perhaps just that which would have been expected *à priori* from the conditions of American life and the peculiar characteristics of American women.

TABLE V.—OUT-PATIENTS.

No.	Nationality.	Pelvis.							Diagnosis and remarks.	Labor.	Operator.
		Iliac Spines.	Iliac Crests.	External conjugate.	Diagonal conjugate.	Symphysis.	Promontory.	True conjugate by estimation			
		Inches.	Inches.	Inches.	Inches.			Inches.			
1	Jewess,	9¾	10	7½	4¾	.....	.....	4	General contraction of slight degree, flat.	Version; extraction difficult; craniotomy to after-coming head.	Townsend.
2	Jewess,	8¾	10½	6½	4¼	Normal.	Low.	3¾	Simple flat.	Version.	Reynolds.
3	Jewess,	8¾	10	8	4¾	Normal.	Normal.	4	Naegele oblique.	Version and easy extraction after six hours delay at brim, O. D. P. Diagnosis by internal palpation, and constant difference of 1 c.m. in usual special measurements. (Am. Journ. Obstet., July, 1890.)	Reynolds.
4	Jewess,	8½	10	7½	4¼	Normal but erect.	High.	3¾	Justo-minor	Axis-traction forceps at brim.	Reynolds.
5	Jewess,	8¾	9¾	6¾	4	Normal.	Normal.	3½	Simple flat.	Fœtus anencephalic; face presentation; extraction of body difficult. Operation by house physician; measurements by Reynolds	Reynolds.
6	Jewess,	9½	10¼	7¼	4¼	Normal.	Normal.	3¾	Generally contracted, flat.	Axis-traction forceps.	Townsend.
7	Jewess,	Taken but not preserved.			4¼	Normal.	Normal.	3¾	Simple flat.	Forceps, axis-traction, failed to extract; version difficult on account of bad constriction ring; extraction difficult; 10 lb. child.	Reynolds.
8	Jewess,	9½	10½	7	4	Normal.	High.	3¼	Generally contracted flat, transverse space markedly diminished.	After failure of axis-traction forceps, Dr. Richardson called in consultation, and did version, but failed to extract. Craniotomy to after-coming head.	Reynolds.
9	Jewess,	9	10¾	6¾	4	2 inches long and very erect.	Very high.	3	Justo-minor.	Craniotomy after consultation with Dr. C. M. Green. Sixty hours in labor when first seen.	Reynolds.

10	Jewess,	9	9¾	6¾	4	Long and erect.	High.	3¼	Justo-minor.	Craniotomy because exhausted by long labor when first seen. Died of fine bronchitis and œdema of lungs, probably secondary to long etherization.	Reynolds.
11	Jewess,	9¾	11	7¼	4¼	Normal.	Normal.	3¾	Pelvis shallow and transverse space somewhat diminished; flat and slight general contraction.	Version.	Reynolds.
12	Jewess,	9¼	10	7	4¼	Long and erect.	High.	3½	Justo-minor.	Child 9 lb.; dead when first seen.	Reynolds.
13	Jewess,	9	10	7½	4¼	Normal.	Normal.	3¾	Simple flat.	Version.	Reynolds
14	Irish,	External measurements lost.			4	Normal.	Normal.	3½	Simple flat.	Version.	Reynolds.
15	Irish,	9¾	11	8	4¼	Short but erect.	Low.	3¾	Generally contracted flat.	External measurement much increased by great stoutness of patient, but transverse space markedly diminished, by internal palpation and mechanism. Axis-traction forceps failed. Version difficult; child stillborn.	Reynolds.
16	Irish,	8¾	10	7¼	4¼	Normal	Normal.	3¾	Generally contracted flat	Arrest of O. D. P. at brim, normal rotation to O. D. A. Axis-traction forceps.	Reynolds.
17	Irish,	9½	10¾	7¾	4½	Rather erect.	Rather high.	4	Justo-minor.	Contraction very slight. Arrest due probably to O D.P. position; fœtal heart failing	Townsend.
18	Irish,	9¼	11	7½	4¾	2 inches.	Normal.	4	Justo-minor.	Contraction very slight; child 8½ pounds, S. D. A. Forceps, axis-traction, to breech at brim.	Townsend.
19	Irish,	9¾	10¼	7	4½	Long and erect.	High.	4	Justo-minor.	Forceps.	Reynolds.
20	English,	9¼	10	7¾	4½	Inclined.	High.	3¾	Simple flat.	Version.	Reynolds.
21	American,	10	11	7½	4¼	Erect.	High.	3¾	Justo minor.	Axis traction forceps; 10 lb. child.	Reynolds
22	Jewess,	.....	.....		"Pelvis contracted."			.....	.....	Forceps	Green.
23	American,	.....	.....		"Justo-minor."			.....	.....	Forceps.	Green.
24	Jewess,	.....	.....		"Contracted pelvis."			.....	.....	Version.	Townsend.
25	Irish,	.....	.....		"Contracted pelvis."			.....	.....	Forceps.	Townsend.

TABLE VI.—HOUSE PATIENTS.

No.	Nationality.	Pelvis.								Labor.	Operator.
		Iliac spines.	Iliac crests.	External conjugate.	Diagonal conjugate.	Symphysis.	Promontory.	True conjugate by estimation	Diagnosis and remarks.		
		Inches.	Inches.	Inches.	Inches.			Inches.			
26	English,	10½	10¾	6¾	4⅛	Normal.	Low.	.....	False pelvis visibly flaring; simple flat probably rhachitic	Normal labor, mechanism of a flattened pelvis.	.....
27	Irish,	10½	11	.....	4	Long.	Low.	3½	Simple flat.	Normal; position of sagittal suture transverse.	.....
28	Irish,	10½	11¼	7	4	Normal.	Normal	3½	Simple flat; outlet flaring.	Normal; position of sagittal suture transverse.	.....
29	American,	8¼	10¼	7	4½	Erect.	High.	4	Justo-minor.	Normal, but mechanism of early flexion.	.....
30	Negress,	9	9½	7	4	Increased inclination.	Very low.	3¾	Transverse space not diminished; simple flat, possibly rhachitic.	Normal labor; head low on entrance.	.....

TABLE VII.—PRIVATE PATIENTS.

No	Nationality.	Pelvis.							Labor.	Operator.
		Iliac spines.	Iliac crests.	External conjugate.	Diagonal conjugate	Symphysis.	Promontory	True conjugate by estimation	Diagnosis and remarks.	
		Inches.	Inches.	Inches.	Inches.			Inches.		
31	American,	9	11	8	4¼	Long.	High.	3¾	Justo-minor external measurements increased by extreme stoutness of patient.	Spontaneous delivery at seven months.	.....
32	Irish,	9¾	10¼	7½	4¼	Normal.	Normal.	3¾	Simple flat.	High forceps.	Reynolds.
33	English,	9	10	6½	4	Normal.	Normal.	3½	Flat, with slight general contraction.	Version.	Reynolds.
34	Irish,	10	12	8	4¼	Normal.	Normal.	3¾	Simple flat; large external measurements due to fatness of patient.	Seen with Drs. F. C. Murphy and F. W. Goss. Version before my arrival. Craniotomy to after-coming head.	Reynolds.
35	English,	Patient moribund when seen. External measurements not taken.					Low.	2¾	Transverse space much decreased. Pelvis shallow, generally contracted, flat.	Seen with Drs. P. C. Gavin and J. P. Reynolds. Breech presentation; body extracted before my arrival. Craniotomy to after-coming head.	Reynolds.
36	American,	9½	10¾	6¾	5	Arch masculine.		4¼	Transverse space diminished, especially at outlet. Marked kyphosis. Justo-minor with kyphosis added.	Dwarf (50 in., 90 lb.); subject of old and recent dorsal Pott's disease. Sent to me by Dr. Burrell, and referred to Bost. Lying-in Hosp. service of Dr. Richardson, who induced labor at 7 months.	.....
37	American,	10	11¾	8	4¼	Erect and relatively long.	Normal	3¾	Bones all slender; patient fat. Justo-minor.	Seen at 7 months with Dr. J. P. Reynolds. Induction at 8 months recommended. Patient left Boston.	... .
38	American,	8.4	10.4	6.6	.....	.....	.....	.....	Robert's pelvis. Boston Med. and Surg. Journ., vol. cxxii. No 17, Apr. 24, 1890.	Seen with Drs. G. Haven and A. Coolidge, Jr. Forceps failed. Craniotomy.	Haven.
39	American (colored),	10	10¾	6½	4¼	Short and much inclined.	Low.	3¾	Pelvis very shallow. Simple flat, probably rhachitic.	Seen with Dr. H. J. Barnes at eight months. Recommended to wait until term. Normal labor.	.....

REPORT OF A SUCCESSFUL CÆSAREAN SECTION.

By Henry D. Fry, M.D.,
Washington, D. C.

I was called Sunday, February 9, 1890, about 8 o'clock in the evening, to see a dwarf who had been in labor thirty-six hours. The date of her last menstruation was April 20, 1889; the date of expected confinement, January 27, 1890. The patient had partaken sparingly of nourishment for three or four days preceding my visit, and had slept little for several nights. During Sunday she had kept up on whiskey alone, having drank about one pint.

Her pulse was 144, and sublingual temperature 99.4°. The pulse had considerable volume and strength; its rapidity being due, in great measure, to nervous perturbation.

The uterine contractions were of the character which primiparæ frequently experience for some hours without producing marked exhaustion.

The abdomen was large and prominent, and the uterine tumor was felt to undergo rhythmical contraction and relaxation.

The child presented by the head and occupied the left occipito-anterior position. The head was above the pelvic brim and projected well over the symphysis pubis. By auscultation the fœtal heart-sounds were audible to the left of the umbilicus.

Digital examination revealed the vulva and vagina soft, moist, and distensible. The cervix was situated high and was not effaced, the os and cervical canal being dilatated only sufficiently to admit the index finger. All the diameters of the pelvic cavity were diminished, and that of the diagonal conjugate measured about one inch and a half.

Recognizing the necessity for Cæsarean section, steps were taken for immediate action. Full directions were given for the preparation of the room, and the patient was ordered a warm soap-bath, a vaginal douche of bichloride of mercury solution, and an enema to move the bowel. I left at 9 o'clock to make my arrangements, and returning at 11, the patient was etherized and the operation begun at 11.55. The bladder was evacuated with a catheter, the hair shaved from the pubes, and the field of operation made aseptic in the usual manner. Every effort was made to secure asepsis by preparation of the hands, instruments, sponges, etc. The following gentlemen were present: Drs. S. C. Busey, W. W. Johnston, A. F. A. King, W. M. Sprigg, and R. M. Ellyson, and I wish to express my gratitude for their assistance. To Drs. Sprigg, Ellyson, and H. B. Deale I am greatly indebted for faithful attendance during the after-treatment.

An incision was made through the linea alba from the umbilicus to within one inch and a half of the symphysis. The peritoneal cavity was opened and the incision carried through and two and one-half inches above the umbilicus. The uterus was lifted out of the abdominal cavity and the parietes held in close apposition to its sides. An elastic ligature was next passed behind the organ and adjusted around the cervix. This was held loosely in the hands of an assistant, who stood prepared to tighten it at a moment's notice. A large sponge was placed at the lower angle of the wound to prevent blood or amniotic fluid from entering the peritoneal cavity.

Before incising the organ an unsuccessful attempt was made to locate the position of the placenta, which proved to be attached to the anterior wall, and was cut directly upon in opening the uterus. Bleeding, which had been trifling, now started freely, but was immediately controlled by the constriction of the elastic ligature.

The placenta separated from its attachment and was removed. The infant was delivered by the head, which presented at the lower third of the opening. It was asphyxiated, and without doubt would have been lost but for the skilful attention of Drs. Busey and King.

The tension of the elastic tube was removed and bleeding was slight. The uterine cavity was cleansed of blood-clots and shreds of membrane, sponged and dusted with iodoform. The uterine wound, which was about five and one-half inches long, was closed with thirteen deep and fifteen superficial sutures. Silk was used for both, the superficial ones being fine. The deep stitches passed down to, but not through, the endometrium; the superficial approximated the peritoneal edges, which were inverted.

No fluid escaped into the peritoneal cavity during the operation, nevertheless it was irrigated with boiled water at a temperture of 115°. The irrigation had a good effect in producing firm uterine contraction. Hypodermic injections of ergot were also administered.

The abdominal wound was next closed with deep and superficial silk sutures.

The time occupied from the beginning of the operation to the removal of the child was six minutes, and it was completed in full, in one hour.

The patient was transferred to bed in excellent condition and without the slightest indication of shock. In fact, it was observed that her pulse was better than before the operation. She was wrapped in blankets, and bottles of hot water were applied to her extremities. During the remainder of the night she slept some, complaining of nausea, and vomited a few times.

During the day of the 10th her pulse varied from 108 to 118, and her temperature from 99° to 100.4°. She complained greatly of thirst and begged for water, but nothing whatever was permitted by mouth for seventeen hours.

Rectal injections of warm salt-water and beef-tea were given. The urine was drawn every six hours.

Monday night was passed comfortably, and Tuesday the pulse the temperature ran about the same as the day previous. In the afternoon the administration of calomel triturates was begun and repeated every two hours.

On Wednesday (third day) the bowels moved twice.

Thursday night the patient was restless, and Friday (fifth day) her condition was not so satisfactory. At 7 in the morning her temperature was 100.7°, at 10, 101.5°. The abdominal

wound was examined and looked in excellent condition. A disagreeable odor of the lochial flow was detected for the first time. The cervix was small, and os closed. Believing the unfavorable symptoms were septic and due to deficient drainage of the uterine cavity, the cervical canal was thoroughly dilated with steel instruments and the cavity of the uterus explored and then irrigated with a 2-per-cent. solution of carbolic acid. No clots or débris were found in the uterus. The immediate effect of the manipulation was to run up the temperature to 104°, but it soon began to fall, and at 7 o'clock in the evening was 99.8°. From this time the lochial discharge was regular and free from odor. The temperature did not rise again, and the patient had an uneventful convalescence. Antiseptic vaginal douches were administered for some days.

The baby, a well-developed and hearty boy, is at present four months of age. The mother is entirely recovered. I have since obtained the following information concerning her:

She is the sixth of eight children—all girls. Her parents are of American descent, and they lived upon a large farm, possessing every advantage of healthy surroundings. Her sisters are all living and healthy.

She was a feeble child and did not walk until eighteen months old. Her height is forty-five inches.

Judging from the conformation of the skull and the incurvation of the long bones, she had been evidently a subject of rickets in early life.

The measurements of the external pelvic diameters are:

Distance between	the anterior superior spines of ilia	. . .	7½ inches.
"	" middle of crests of ilia	. . . . .	5¾ inches.
"	" of external conjugate	. . . . .	5¾ inches.
"	" great trochanters	. . . . .	11½ inches.

The upper portion of the sacrum projects forward between the ilia, causing a marked depression at the corresponding part of the back. The greatest diameter between the iliac crests is at the anterior spines. The variety of deformity is the flattened, generally contracted pelvis.

THE CÆSAREAN SECTION FROM THE STANDPOINT OF RELATIVE INDICATION.

Report of Two Cases.

By Egbert H. Grandin, M.D.,
New York.

Less than a decade ago, when the maternal mortality following the Cæsarean section varied from twenty per cent. to forty-five per cent., the welfare of the mother was alone to be considered, and embryotomy was the sole recourse in instances of absolute contraction as also in cases of relative contraction, where the probability was that even version would have to be followed by perforation of the head in order to effect delivery. During the past five years the advances in abdominal surgery, and the certainty we have gained in securing due closure of the uterine wound, have altered the picture completely. The obstetrician has reached that stage when in hospital practice certainly he need no longer feel impelled to sacrifice the living child in instances of absolute pelvic contraction, and where in the presence of even relative contraction, he has the right of choice between version and possible craniotomy, or the Cæsarean section. Such, at least, is the position assumed by the writer, and that he has the courage of his convictions the cases recorded further on testify.

At the present writing the maternal mortality of the Cæsarean section in hospital practice varies from five to ten per cent. Broadly speaking, the mother's chances of recovery are

nine out of ten.[1] In the hands of certain oporators the mortality is *nil.* (*Vide* Hertsch, *Archiv für Gyn.*, xxxvii. 1 Report of seven cases with no deaths.) This rejuvenated operation, indeed, is following, as regards its record, in the footsteps of ovariotomy. To-day very exceptionally in the hands of an expert is laparotomy for the removal of an ovarian cyst fatal, and yet this operation is decidedly more difficult than is the Cæsarean section. In short, the Cæsarean section performed *advisedly* ought not to have a mortality rate, and the next decade will witness its frequent performance in cases where the alternative is *probable* embryotomy, that is to say, under the relative indication. This prediction is based on the following considerations.

The obstetrician who has been called upon frequently to sacrifice the living child in order to effect delivery, sooner or later must begin to question if, after all, he is in conscience bound to do so in face of the relatively slight risk to which the bearer of the child is subjected under the modern Cæsarean section. It is not to-day a question of destroying the lesser in order to save the greater life. We have nearly reached the stage when, on the contrary, it is a question of saving two lives at but slight risk to one, through resort to an operation which, when performed according to modern rules, is one of the simplest of all the major operations which fall to the lot of the obstetrician. Anyone who has performed embryotomy on the living will admit that, even in the presence of moderate pelvic contraction, the steps are difficult, requiring more technical skill and more experience than does

[1] This paper being argumentative rather than statistical, the reader is referred for data of the latter nature to R. P. Harris's papers published during the past few years in The Medical News and the American Journal of the Medical Sciences; to Leopold's work on *Der Kaisershnitt und seine Stellung sur Künstlichen Feügeburt Wendung*, etc. (Stuttgart, Enke, 1888); to R. A. Murray's paper in the New York Medical Journal, June 21, 1890; to the articles in vol. ii. Americam System of Obstetrics, Philadelphia (Lea Brothers & Co.); to vol. iv. of the Cyclopædia of Obstetrics and Gynecology, edited by Grandin (Wood & Co., New York, 1887).

the Cæsarean section. Embryotomy, however skilfully performed, carries with it about the same elements of danger as accompany the Cæsarean section. Traumatism, shock, hemorrhage, sepsis—such are the factors which we aim to avoid in the one operation as in the other. When we carefully consider these two operations, I believe it may be emphatically stated that the sole reason why the Cæsarean section carries with it a greater maternal mortality than does embryotomy, is the fact that here, even as in all operations involving the opening of the peritoneal cavity, operators are not careful enough of the peritoneum during the operation and of the intestines afterward. This is a point on which I propose to dwell further on. For the present sufficient the statement that to my mind the factors which to-day militate against a successful embryotomy are exactly the same as those which are at the bottom of the maternal mortality from the Cæsarean section, and, in stating the deductions which my experience with the latter operation justifies, I shall endeavor to sketch the means at our command for nullifying these factors.

In order to obtain the results which I confidently anticipate the Cæsarean section will yield, and in order to relegate embryotomy to its proper sphere—oblivion, except where the fœtus is dead—there are certain pre-requisites to which I desire, briefly, to call attention before giving the histories of two operations recently performed by myself and before stating what seem to me the essentials to success.

At the outset, obstetrics is with us, and to a less degree in Europe, too little of a science. For obvious reasons, it is impossible to elevate it to the rank of a specialty, and yet I am convinced that fewer mothers would be maimed, if not lost, and that fewer children, certainly, would be sacrificed, could the lying-in chamber be in the hands of an obstetric specialist as frequently as, of late years, it has sooner or later after delivery been visited by the gynecologist. The root of the evil lies in the medical school. The student is graduated with the impression that labor being a physiological affair, all

he need do is to soak his hands in bichloride, have his forceps in his satchel, and never to forget his antiseptic pad. This is all excellent instruction, and these precautionary measures are most laudable, but there is much beyond this, and not the least is *accurate pelvimetry*. The student should be taught to make a careful examination of the pelvis of every woman he is engaged to confine; he should be told that in every instance where he suspects slight pelvic deformity it is his bounden duty to resort to the well-known means at our disposal for determining the degree of contraction and the probable size of the fœtus which in due course of time must pass through the parturient canal. Having acquired this knowledge, he is in a position to estimate the worth, in a given case, of induced labor, forceps, version, Cæsarean section. Thus the obstetrician will be able to determine upon the latter measure *advisedly* and not increase the mortality rate of the operation by resorting to it after the failure of forceps and of version or of both. The above description applies to the ideal obstetrician. What nature of an animal is he, to his shame, far too frequently to-day? How often does he listen for the fœtal heart, or if he listens can he hear it? How many possess a pelvimeter or use one? How many ever examine their patients prior to the onset of labor? How many ever stop to think, "Is the forceps indicated?" before using the instrument fruitlessly? More thorough obstetric education, then, is requisite before we can hope to place the Cæsarean section where it belongs—in the rank of a most beneficent operation—in that it avoids the mutilation of an innocent being in order to save, frequently, a guilty one. (The unmarried, for instance, who constitute such a large proportion of our hospital *clientèle.*)

It is further requisite to educate the laity in favor of the Cæsarean section, to disabuse people of the idea, which I would relegate to the past, that it is the physician's business to murder the child, rather than to save it through subjecting the mother to slight risk. The day has come when the

obstetrician can claim his right to keep the commandment, "Thou shalt do no murder," and to preach the doctrine long taught by the Catholic Church: "If the child cannot be extracted without destroying it, it is a mortal sin to kill it." I was highly gratified some time since to find an Episcopal clergyman in accord with this view, and I would that for a while the clergy of all denominations would drop their squabbles over creeds and texts, and teach their flocks that if they will procreate, it must not be in the thought that the physician is bound to step in and save them from all possible consequences—even to the extent of murder of the babe. One of the means toward the desired end—the proper education of the laity in this matter—will be the decision of surgeons to maternity hospitals to cease doing embryotomy in instances in which the Cæsarean section is not contra-indicated; that is to say, to perform the section in all cases in which the probability is, after careful examination (if need be, under an anæsthetic, in order to estimate properly the size of the fœtus), that any other operation will yield a dead child. Then, in the course of time, the statistics of Cæsarean section will demonstrate such slight risk to the mother that there will no longer be an excuse for embryotomy. Acting on this principle at the New York Maternity Hospital, my colleagues and myself have had three successive sections, saving all the mothers and the children. It is my hope and belief that in the near future our record in this direction will prove a stimulus to the performance of the operation, even in private practice, under the relative indication. And why not? Scores of women the world over risk their lives to-day to secure relief from pain. Scores of surgeons the world over open the abdomen for the removal of ovaries and of tubes which in no sense endanger life if allowed to remain. If it be justifiable to do this, and I am not disputing it, all the more is it justifiable to open the abdomen to save life and to avoid murder, especially since, to my mind, the risk to the woman, other things equal, is no greater. If the woman may

take her life in her hands in order to be rid of, we will say a cystic ovary, by what right may she refuse to run about the same risk in order to save the fruit of her womb?

To state my position in a nutshell: Given an instance of slight pelvic contraction in which the chances are against the delivery of a living child *per vias naturales*, and the time for induction of premature labor with resulting viable child having elapsed, the obstetrician is justified in performing the Cæsarean section, provided always the fœtal heart-sounds are clear and regular. Such should, now, be the rule of practice in maternity hospitals, and such, I believe, will eventually be the rule in private practice. This has been my belief for years. I am repeatedly on record as anxious in this direction to shake myself free from the fetters of the past, fetters which we were in duty bound to wear so long as the Cæsarean section almost necessarily entailed the death of the mother, but fetters which in the presence of the statistics of to-day, even, I can no longer hold should bind us. Let us remember that these statistics are not a fair statement of the results which can be obtained when obstetricians uniformly *elect* the operation, and do not resort to it only when the mother is exhausted from protracted labor, possibly from fruitless attempts at delivery by forceps or version. The operation I plead for is done even as is an ovariotomy. The patient is carefully prepared for it, and at the beginning of labor, before she has had a chance to become in the least exhausted either by nature or by art, the abdomen is opened and the child delivered. Such should be the operation the results of which will amply justify us in rejecting embryotomy of the living fœtus.

The first case which I report was performed at the New York Infant Asylum, July 13, 1890, and its history—for which I am indebted to the resident obstetrician, Dr. V. M. Davis—is as follows:

Mary L., German, single, aged twenty-eight years, primipara. Had been subject to attacks of asthma for a year. Admitted to Infant Asylum April 22, 1890. Attacks of asthma and bron-

chitis very frequent, one in June particularly severe, at which time she had pleurisy. She ate very little, and her general condition was low. She had a large cystic goitre. The date of her last menstruation was November 1st, and she expected labor the last of July. Contractions began on morning of July 13th, becoming regular and frequent by evening. Dr. Grandin, the visiting physician on duty, was summoned. The uterine contractions were regular and strong. The cervix was merged in the lower uterine segment, and the external os was represented by a dimple in the left posterior cul-de-sac, not admitting the point of the uterine sound. Such had been the local condition for a number of hours. The fœtal heart-sounds were rapid and not very strong. The pelvic measurements were, spines 8½ inches, crests 9¼, diameter at the brim 6½. The promontory of the sacrum was readily accessible, the conjugata vera being estimated at 3¼ to 3½ inches. The pubic arch was narrow, and the ischial tuberosities close together. The fœtus presented by the vertex (L. O. A.), and was estimated of average size.

Dr. Grandin determined on the Cæsarean section, for the following reasons: The condition of the external os called for mechanical dilatation, and, in view of its pin-hole state and firm, unyielding character, this dilatation would require considerable time. Owing to the marked contraction at the pelvic outlet and the relative contraction at the pelvic brim, he judged that the safety of mother and child would be best subserved by performing version after dilatation had been accomplished. Further, it seemed probable that the contraction at the outlet would necessitate perforation of the after-coming head in order to effect delivery. These manipulations — dilatation, version, possible craniotomy—aside from the risk to the child, carried with them certainty of maternal exhaustion, to say nothing of the traumatism to the parturient canal likely to result from such efforts at delivery. He therefore summoned his colleagues, Drs. H. J. Garrigues and George T. Harrison, in consultation, and whilst awaiting their arrival preparations were made for the Cæsarean section.

Dr. Harrison reached the hospital at 9.30 P.M., and sanctioned the Cæsarean section.

The operation was begun at 9.45 P.M., the patient's general

and local condition being unchanged. Chloroform was the anæsthetic, and the instruments and sponges were immersed and cleansed in boiled water, no antiseptic whatever being used during the operation, except a two and a half per cent. carbolic solution for washing the hands of the operator and his assistants. In addition to Dr. Harrison, there were present Drs. Davis, Hamilton, Sherman, and Parry, of the hospital staff.

The incision was begun in the median line and extended above the umbilicus and to the pubes for nine inches. There was but little hemorrhage. The uterus was turned out and surrounded by hot towels. A provisional silver wire suture was passed through the abdominal parietes behind the uterus, to keep the intestines from prolapsing. An elastic ligature was thrown around the cervix and tightened by Dr. Davis as the uterus was incised. This incision measured about four and a half inches. The placenta was found underneath the uterine incision. Dr. Grandin passed his hand around it, seized a foot, and delivered the asphyxiated infant without difficulty. The placenta and membranes were then removed, and the uterine cavity was washed out with hot water. Ergot, ʒj, fluid extract, was administered hypodermically.

The child (male) was delivered at 10 P.M., July 13th, was resuscitated after a few minutes, and weighed six pounds one ounce.

The measurements of the fœtal head were: Sub-occipito-bregmatic, $3\frac{3}{4}$ inches; occipito-frontal, $4\frac{1}{2}$; occipito-mental, 5; biparietal, $3\frac{1}{2}$; circumference, $13\frac{3}{4}$.

Ten silkworm-gut sutures, not including the mucosa, were used to close the incision in the uterus. Sero-serous apposition of the peritoneum was secured by a continuous catgut Lembert stitch. The elastic ligature was then removed, the uterus contracted well, and there was no hemorrhage. The peritoneum below the elastic ligature, and down to its reflexion on the bladder, was found torn, and fully a half-hour had to be consumed in repairing this. Meanwhile the uterus was enveloped in hot towels, and the peritoneal cavity was repeatedly flushed by hot water.

The uterus was replaced in the pelvic cavity well contracted, and the peritoneal cavity was again thoroughly irrigated. The

abdominal parietes were brought together by deep silkworm-gut sutures, and here and there a superficial catgut suture.

At 12.25 A.M., July 14th, the patient had rallied from the anæsthetic and was placed in bed. Her condition was excellent. No shock. Another hypodermic of ergot (ʒj) was administered, and teaspoonful doses of hot water were ordered as the only thing to be given by the mouth. Opium in any shape was forbidden.

July 14, 8 A.M. Patient had slept well. No nausea. Good drainage of lochia. Ordered ʒiv hot beef peptonoids by rectum every four hours; hot water by mouth; infant to the breast every six hours.

15*th*, A.M. Imperfect drainage through pin-hole os. Electrolized up to No. 25 F.; gentle divulsion. Ordered Seidlitz powder in divided doses, frequently repeated, to secure and maintain intestinal peristalsis. In P.M., turpentine enema secured small dejection. Nourishment during the day, in addition to rectal nutrient enemata, consisted of peptonized milk.

16*th*. Considerable nausea and vomiting during the day, slight tympanites, bowels moved freely, lochia diminished but not fetid. Gentle divulsion of os was followed by normal flow of lochia. In the afternoon two slight asthmatic attacks. Complaints of after-pains. R.: Antipyrine (gr. xv), spts. ammon. aromat. (ʒj), p. r. n. q. two hours, for three doses.

17*th*, A.M. Nausea, retching, eructation of gas, hysterical attacks, followed by apparent unconsciousness of a few minutes' duration. Breathing asthmatic. In a few hours a second restless semi-unconscious paroxysm. Cephalalgia. Ordered ice-bag to head. P.M., enema of assafœtida and turpentine was followed by large dejection. About 8 P.M. crisis of cerebral anæmia, followed by display of temper requiring manual restraint. Lochia normal. But little nourishment retained during the day.

18*th*, A.M. Asthmatic respiration. Hysterical attack—simulating catalepsy — lasting one-half hour. Frequent dejections. Considerable tympanites. In the afternoon, second asthmatic attack. Took ample nourishment during the day. Ordered digitalis, ♏ v t. d.

19*th*, A.M. Had a fair night. Nourishment had to be forced. Number of fluid movements. Abdominal sutures removed.

Union apparently perfect. One small stitch abscess. Lochia normal.

20*th*, A. M. Frequent movement of the bowels; tympanites considerable. Distaste for food. Stimulants and digitalis pushed.

21*st*. Frequent liquid movements; tympanites diminished. Gaping of abdominal incision for two inches below umbilicus. Granulations plentiful. One catgut suture inserted to bring gaping surfaces in apposition. About fifteen dejecta during the day. Patient restless, unmanageable, semi-delirious, screamed most of the night. Had to tie her in bed. Stimulants, digitalis, opium, p. r. n.

22*d*. About the same state of affairs.

23*d*. Frequent movements of the bowels. Patient wandering and restless. Refused nourishment. Forced feeding, followed by regurgitation. Melancholic. Stimulants and digitalis hypodermically.

24*th*, 25*th*, 26*th*. Similar conditions. At intervals maniacal. On several occasions had to tie her in bed. Marasmus. Will not retain food. Owing to persistent diarrhœa cannot feed by rectum. Whiskey and digitalis hypodermically. Asthmatic attacks. Locally the cervix has re-formed, uterus has involuted well. No fetor to uterine discharges. No pain or tenderness. Somnolence toward evening of 24th. Dimness of vision. Urine free from albumin. These symptoms continued steadily up to morning of 26th, when patient began to fail rapidly, and died at 10.45 P. M., July 26th. The accompanying chart (on next page) records the temperature, pulse, and respiration.

Clinical cause of death: Acute inanition, associated with puerperal mania.

Autopsy, twenty-four hours after death: The abdominal wound was largely united by first intention. Slight loss of lustre of peritoneum in neighborhood of abdominal incision. No fluid in peritoneal cavity. Uterine peritoneum united. There had been no oozing of lochia into the cavity of the peritoneum. The lips of the uterine incision were in close apposition, but union was imperfect. The uterus was of normal size for thirteenth day *post-partum*. Its cavity contained a little detritus. Heart normal.

Day of Childbed
Hour
Day of Delivery
1
2
3
4
5
6
7
8
9
10
11
12
13
107°
106°
105°
104°
103°
102°
101°
100°
99°
Pulse
Respiration

Extensive double plastic pleurisy of some weeks' duration. Slight meningitis along the longitudinal fissure. Fatty degeneration of the liver. Spleen normal. Blood scanty in amount.

In the opinion of the curator, there had existed no septicæmia. He thought the pleurisy was a factor in the causation of death.

Remarks.—Notwithstanding the unfavorable issue in this case, the result cannot, I think, be laid to the operation performed. Death cannot, after close study of the case, be charged to the section *per se*, and I do not regret having performed it. The patient's nutrition was against her at the outset. The mania which developed was latent during the whole time she was under observation in the asylum. She was always moody and melancholic, conditions which were aggravated by the fact that she was without friends and home. I question if the mania and inanition would not have followed selection of the alternative operations which offered—forcible dilatation, version, and probable craniotomy. The case was certainly an unfavorable one for any operation. The child is at this writing (August 31st) in excellent health, and were I anxious to apologize for the operation, I might question if of the two lives the more valuable had not been saved.

Let those inclined to criticise the case from the standpoint of the embryotomist bear in mind the fact that this patient did not die of shock, hemorrhage, or sepsis, but of a condition which not exceptionally, in patients of low nutrition, leads to a fatal issue after delivery *per vias naturales*.

Case II.—J. P., aged twenty-three years, single, German by birth, entered Maternity Hospital June 24, 1890. She is a small, wiry, poorly-nourished patient, of marked phlegmatic disposition. Family and personal history good.

First pregnancy; no miscarriage or abortions. Physical examination revealed the heart and lungs normal. Pelvic examination by Dr. Grandin (July 20, 1890): Spines il., 8½ inches; crests, 9½ inches; D. B., 6¼ inches; diagonal conjugate, 4 inches; conjugata vera, 3½ inches (estimated). Bones thin; very narrow pubic arch; sharp prominent edge to right ramus; promontory of

sacrum within easy reach. Fœtus estimated of average size, presenting L. O. A.

Dr. H. G. Garrigues saw the patient in consultation with Dr. Grandin, and agreed with him that the Cæsarean section was justifiable from the standpoint of the safety of the child, and that the increased risk to the mother over version and possibly craniotomy was slight enough to warrant the section if she desired a living child.

The patient was carefully prepared by daily baths, the abdomen being scrubbed with soap and water, bichloride and ether, and she was ordered stimulants and extra diet. It was impossible to predict the exact date of confinement, as the woman was uncertain in her data. Dr. Grandin decided to operate at the outset of labor.

Labor began at midnight, August 8, 1890. One-third grain of morphine was administered to retard the contractions. Patient was given a bichloride bath, bichloride douche, the abdomen and pubes were shaved and scrubbed with bichloride; the bladder and rectum were emptied. Patient anæsthetized at 3.40 A. M., August 9th, the cervix being one-fourth dilated. Chloroform was first used, afterward ether. Patient took anæsthetic well. Pulse before operation 74. Operation began at 4.03 A. M., August 9th, Dr. Grandin being assisted by Dr. I. H. Hance, assistant surgeon to the hospital, and by Drs. Van Rensselaer, Heydecker, and Probin, of the maternity staff.

The incision was made in the median line, two and a half inches below umbilicus, extending two inches downward. This was prolonged to a point just below the ensiform cartilage with blunt scissors. A few bleeding points were clamped. The uterus was extracted from abdomen at 4.08 A. M., and immediately surrounded with towels wrung out of hot boiled water, no antiseptic whatever being employed during the operation. A provisional suture was inserted into the abdominal parietes behind the uterus. At 4.12 A. M., the rubber tourniquet was applied about cervix with a loose single knot. At 4.15 A. M., incision was made into uterus, the tourniquet being tightened as the operator incised the uterus. Incision in uterus began two inches below fundus, and was extended downward for about five inches. The placenta was found to be attached immediately

below the incision. The hand was passed around the placenta, and the child was extracted by a foot. It was asphyxiated, but was readily resuscitated. The placenta and membranes were removed, and the uterine cavity was flushed with hot boiled water. The uterus contracted firmly and rapidly as soon as it was emptied. Eight silkworm-gut sutures were then passed through the uterine peritoneum and muscle, avoiding the decidua vera.

These stitches were tied at 4.28 A.M. The pulse very materially weakened as the child was extracted, but upon hypodermic administration of stimulants it soon regained its former quality. Three hypodermics of ergot, ʒss each, were then given.

At 4.45 A.M. a continuous catgut Lembert stitch was used for sero-serous apposition, the deep uterine sutures being thus covered over. Constant irrigation with hot boiled water was kept up during these steps.

At 4.48 A.M. pulse was 120, of good quality. The tourniquet was then removed and the uterus contracted firmly. At 4.51 the abdominal cavity was again washed out, the uterus replaced, and the parietal peritoneum brought together by a continuous catgut suture. At 5.06 pulse was 116 and of good quality. At 5.11 the suturing of parietal peritoneum was completed.

A line of silkworm-gut sutures, twenty-four in number, were next inserted into the abdominal parietes. At 5.35 the last of these was tied. Pulse 124, of good quality. A hot saline solution, 2½ per cent. (1 pint), was introduced into the rectum, and the abdomen was dressed as is customary. A hot vaginal douche (1 in 8000 bichloride) was given. At 5.55 the patient was transferred to a special room. She was then in a state of shock, semi-unconscious, skin cool and clammy, respirations superficial and rapid, pulse 124.

The child was a male, 7 pounds 7¼ ounces in weight, with the following head diameters: Sub-occipito-bregmatic, 3½ inches; occipito-frontal, 4⅝ inches; occipito-mental, 4⅞ inches; biparietal, 3½ inches; bitemporal, 3½ inches; circumference, 13¼ inches.

After-history: Patient rallied well from the anæsthetic, after which she vomited slightly. Pulse being 138, stimulants were given hypodermically, also ergot. For the vomiting and exces-

sive thirst teaspoonful doses of hot water were given very frequently. She also received ♏ v Magendie's solution. Baby was put to the breast every six hours. Enema of beef peptonoids was given every six hours. The patient slept very little during the night. Next day she had some tympanites, vomited yellowish fluid several times. Given five doses of calomel, one-half grain each, every half hour, followed by a Seidlitz powder, enema of turpentine, and same (♏ v) internally in capsules every three hours for tympanites. No movement followed, and calomel was repeated.

On August 11th she received in the morning five doses of saturated solution of Epsom salts in teaspoonful doses. She then had during the day about two dozen small, loose, thin movements. Ordered: enema of beef peptonoids with whiskey; ♏ iij tincture digitalis three times a day; later peptonized milk *per os* was added in teaspoonful doses. Next day (August 12th) she had about the same number of loose, fluid movements, somewhat more greenish. Ordered: enema of starch, bismuth, and ♏ x tincture of opium, all rectal alimentation to be stopped, and she was fed only by mouth with peptonized milk. Tympanites had nearly disappeared, the diarrhœa was checked.

13*th*. Peptonized milk; brandy every three hours. Her general condition good, except a little pain in lower part of abdomen. On the sixth day after operation (August 14th) the dressing was removed, and it was found that good union had resulted, except the three lower sutures, where there was, however, deep union. No pus was anywhere to be perceived on the wound. Every other suture was removed, and the three lower sutures, where there was absence of superficial union, were touched with a solid stick of nitrate of silver. The line of incision was then covered with a layer of balsam of Peru and redressed. Uterus was hard and well contracted. Phenacetin (10 grs.) was given for the first time, her temperature having passed 102°, also 10 grains of quinine with dilute hydrobromic acid ♏ xx twice a day. In the evening she had a slight chill.

15*th*. Receives now peptonized milk q. s., beef tea, white or an egg with wine of pepsin.

16*th*. Same medication and feeding continued. Slight chill

after taking quinine. The remaining stitches were removed and wound dressed as before. Although no fetor existed, an intra-uterine douche of 2½ per cent. carbolic was given later, to be followed twice daily by vaginal douches of same.

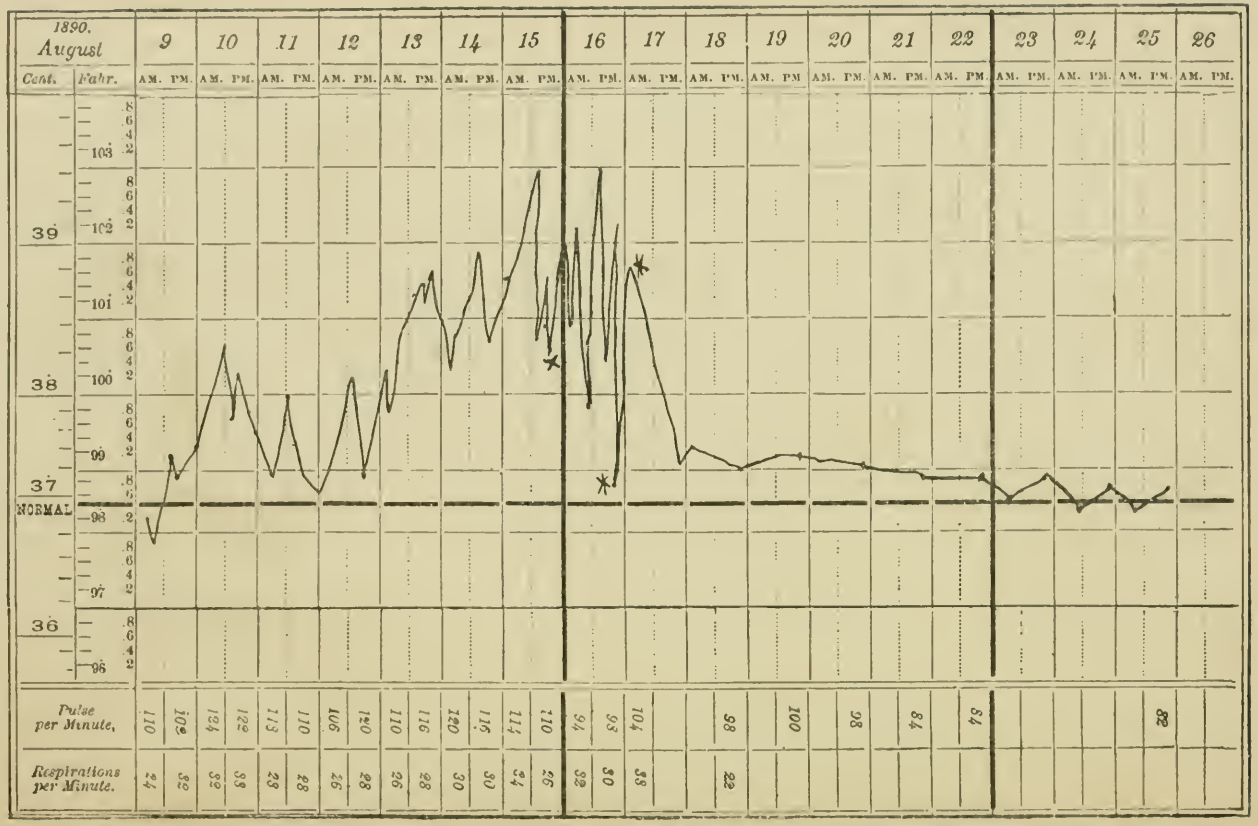
Given six doses each ½ grain calomel hourly, followed by a saline. Patient feels very well save a slight cough, which might account for the temperature. Râles are heard over chest. Ordered opium and squills cough mixture.

17*th.* Patient passed a good night, sleeping considerably. Her general health is good and she is regaining strength, manifesting quite an interest in her child. Her nourishment during the last twenty-four hours has been: 2½ pints peptonized milk, ¾ pint beef tea, whites of five eggs with wine of pepsin, and 2 ounces of whiskey. Medication is 10 grains of quinine twice a day, and ♏ x tincture digitalis t. i. d.

18*th.* Small abscess in the parietes at level of umbilicus was opened, and from this date on the patient steadily convalesced. On the sixteenth day after operation she was transferred to the convalescent ward; on the twentieth day she was out of bed. On August 31st the patient was thoroughly convalescent; the uterus well involuted; is nursing her child.

The child (August 31st) is well and strong. The course of the temperature, pulse, and respiration is shown in the chart on the following page.

Remarks.—This case differed from Case I. in two important particulars. In the first place, I was enabled to prepare the patient properly for the major operation to which I determined to subject her. At the outset of labor she was in as thorough a physical condition as art could place her. Secondly, her intestinal tract had been thoroughly cleansed for days beforehand. These are factors which will always weigh in favor of a successful major operation. Case I., on the contrary, was not seen by me until I was called upon at once to decide what was best for the patient. Her general nutrition was very far below par and the great systemic emunctories were in the reverse of good order. Independently of the mania, therefore, which was a factor in the fatal issue, her convalescence would have been very protracted had she lived.



* Slight chill.

* Small abscess in abdominal incision, at umbilicus, opened.

My experience with four cases of Cæsarean section—I have directly assisted at two in addition to the operations performed by myself—has taught me certain pre-requisites to success which I desire to summarize in brief here.

Aside from deliberate election of the operation, on which I have laid sufficient stress, it seems to me most important to dispense with all antiseptics during the operation. The patient, the operator and assistants having been rendered as aseptic as possible, I would not use thereafter bichloride, carbolic or other germicides. I fear the traumatic effect of these agents on the peritoneum and wounded surfaces more than I fear the possible germs. When we remember the effect of solutions of the bichloride and of carbolic on the hands of the operator, we should hesitate before subjecting the peritoneal cavity to irrigation by such agents in cases where we are not dealing with pus. Boiled water is safer for irrigation, and will answer every demand of modern asepsis.

The question of operating *in situ* on the uterus or after eventration, I would decide in favor of the latter. A few inches more in the abdominal incision are not likely to influence the result, and it is decidedly preferable to be able to guard thoroughly against the entrance of lochia or *liquor amnii* into the peritoneal cavity. Further, in case of difficulty in extracting the fœtus through the uterine incision, the uterus is the better under control if outside the abdomen.

The elastic ligature I shall in the future dispense with and substitute manual compression. The arteries which it is necessary to control are in full view, and much compression is not necessary. In my two cases, and in a third at which I assisted, the rubber ligature either bruised or tore the peritoneum down to its reflexion on the bladder, and in the latter event it is no easy matter to repair the damage, aside from the waste of time entailed.

The securing of ample peristalsis as soon as possible after the patient has thoroughly recovered from the shock of the operation is, to my mind, a most essential factor during convalescence. We thus, as it were, prepare from the start to

meet the only complication which may imperil the patient after she has rallied from shock. This complication is peritonitis. By securing early peristalsis, we drain the peritoneal cavity constantly, we deplete it, and in the event of the development of peritonitis we are in a position to limit its effects, if not to abort it. My rule has been, with this end in view, to prohibit absolutely the administration of opium unless driven to it—for opium paralyzes peristalsis and locks up the secretions—and to resort to measures for moving the bowels within twelve hours after the operation.

In reference to the method of suturing the uterus, I need not at this time lay stress. The sero-serous suture is *the* step which renders it possible to plead for the Cæsarean section at all. If the uterine suture be carefully and rightly used there can be no oozing of lochia into the peritoneal cavity, secondary hemorrhage need not be feared, and thus the elective Cæsarean section performed aseptically may very properly face the single complication which is associated with every operation, major and minor, and against which as yet our surgical resources are often without avail. This complication is *shock*. If the Cæsarean section from a relative standpoint is to be condemned because the woman may die of shock, then on similar ground we must refrain from any surgical procedure not absolutely forced upon us.

Finally, and I purposely repeat myself, in deciding for or against the Cæsarean section in a given case, it should never be forgotten that a most valuable and impressive lesson is taught us by reference to instances where this operation has been performed without the consent of the patient and in the absence of the obstetrician. By far the greater proportion of women on whom the section has been performed by the horn of cattle have recovered.[1] *The operation was in a measure elective, the patients were not exhausted through prolonged labor or fruitless attempts at delivery by forceps or version.* The moral is obvious.

[1] *Vide* Harris, Cattle-horn Lacerations of the Abdomen and Uterus of Pregnant Women. American Journal of Obstetrics, 1887.

WILLIAM HEATH BYFORD, A.M., M.D.

IN MEMORIAM.

WILLIAM HEATH BYFORD, A.M., M.D.

By Edward W. Jenks, M.D.,
Detroit, Mich.

"Homo multi consilii et optimi."

The pioneers of American gynecology are gradually diminishing in number. Among those contemporaries of Sims, Peaslee, Kimball, and the Atlees, who have ceased from their labors, and the few still laboring to add lustre to American gynecology, none has been more widely known and justly appreciated throughout the great Northwest than was William H. Byford. Reared in poverty, and in spite of very limited educational advantages, he long since attained distinction as a teacher, writer, and practitioner. This country has furnished the world with many examples of great men in the various vocations of life, who had but scanty early educational opportunities, but it has not offered a more eminent example of a self-made man than in the person of Dr. Byford.

Those who were brought into close relationship with him can readily understand and appreciate that remark, made by one of his many friends, that he "was no ordinary man." The truth of this statement is verified by the eminence in the medical profession which he attained.

William Heath Byford was born at Eaton, Ohio, March 20, 1817. His father, soon after the birth of his son, re-

moved his family to New Albany, Indiana, and later to the small village of Hindoostan in the same state. This region in those days was a new and very thinly settled country, but it had a district school which William Byford attended until the age of nine, when his father's death compelled him to provide for himself. His schooldays were now ended, but the short time spent in the common school was of incalculable advantage, as it served as the sole basis for his self-education. From his scant earnings, gained at various kinds of manual labor, he assisted his widowed mother in supporting the family for about four years after his father's death, when he and his mother went to his maternal grandfather's farm. He determined to learn a trade, and having been refused to be taken as an apprentice by a blacksmith, he applied to a tailor, who accepted him, and of whom Dr. Byford spoke as "a kind-hearted Christian gentleman by the name of Davis." At the age of twenty he discovered that his ambition was ungratified by learning a trade, for the reason that he had been gaining knowledge of a character that made him aspire to something higher. While serving his employer on the tailor's bench he devoted every spare moment to study. In this way, with zeal, industry, and an unremitting energy, he pursued his studies and obtained a fair knowledge of English, French, Latin, and Greek. Later he directed his attention to chemistry and physiology, and becoming interested in the study of medicine, he determined to become a physician. For the purpose of accomplishing this he entered the office of Dr. Joseph Maddox, of Vincennes, Indiana, and afterward, in accordance with the custom then prevailing in that State, was examined by a board of commissioners appointed for the purpose, who certified to his qualifications and authorized him to engage in the practice of medicine and surgery. He began his professional work at Owensville, in the same State, in 1838, where he remained two years and then removed to Mt. Vernon, where he associated himself with Dr. Hezekiah Holland, whose daughter subsequently became his wife.

Dr. Byford resided in Mt. Vernon ten years. While a resident of this town he entered the Ohio Medical College, from which he was graduated in 1845. After receiving his diploma he resumed practice in Mt. Vernon. In 1847 he made two Cæsarean operations and published an excellent account of them. Although it does not appear that either case was in its fullest sense successful, yet Dr. Byford's publication of these operations was followed by other contributions to medical journals which attracted the attention of physicians quite generally, and gave him a reputation foreshadowing the much greater one he afterward obtained. In October, 1850, he went to Evansville, Indiana, to reside, having been elected Professor of Anatomy in the Evansville Medical College. In 1852 he was transferred to the Chair of Theory and Practice in the same school, which he held until 1854, when the college ceased giving instruction. A medical journal was published at that time in Evansville of which Dr. Byford was one of the editors. At the meeting of the American Medical Association in May, 1857, he was made vice-president, and in the fall of the same year was elected to the professorship of Obstetrics and Diseases of Women and Children in Rush Medical College, at Chicago. He occupied this chair till the organization of the Chicago Medical College two years later, of which he was one of the founders. Here he labored continuously in the same line of work till 1879, when he returned to Rush Medical College to occupy the Chair of Gynecology, especially created for him. Dr. Byford was one of the founders of the Women's Medical College, of Chicago, organized in 1870, and was elected President of the Faculty and also of the Board of Trustees. The success of this institution and the principle which it embodies was always one of his dearest interests, for which the women of the profession throughout America will ever hold him in most grateful remembrance. He took an active part in organizing this Society, of which he was one of the first vice-presidents, and in 1881 was elected president. Dr. Byford

served in various hospitals, but the Woman's Hospital in Chicago, as it is now, with nearly one-third of its beds free, is one of the best of monuments to his persistent labors.

Dr. Byford's first contribution to medical literature was, as before stated, in 1847. This was followed by many contributions to medical journals and in the transactions of various medical societies. His brochure on *Chronic Inflammation and Displacements of the Unimpregnated Uterus* appeared in 1864, and was succeeded in 1866 by his large work on the *Practice of Medicine and Surgery Applied to the Diseases and Accidents of Women*. This publication passed through its fourth edition in 1888. A small volume for general distribution, entitled *The Philosophy of Domestic Life*, was published in 1869, and in 1862 his text-book on *Obstetrics* was published, of which a second edition appeared in 1873. For a number of years Dr. Byford was one of the editors of the *Chicago Medical Journal*, and later became editor-in-chief of the *Chicago Medical Journal and Examiner*. His early investigations and advocacy of the use of ergot in the treatment of uterine fibroids made him an authority on this method. It was made the subject of his address as president of the Section at the meeting of the American Medical Association in 1872, and excited marked attention throughout the country. His name is also closely associated with other procedures, as, rectal drainage of pelvic abscesses which have already opened into the bowel; laparotomy for ruptured extra-uterine fœtation, proposed before Tait's time. Dr. Byford was a consultant of the highest order, both from the standpoint of the profession and that of the *clientèle*, because he was courteous and honorable in his conduct toward physicians, and because as a gynecologist he approached the ideal, in that his special knowledge was based upon the firm foundation of sound judgment and an extensive and varied experience in a general practice of twenty-five years.

In faculty or society meetings whenever disagreements arose

his influence was ever on the side of harmony. Among his *confrères* he was preëminently a peacemaker.

The writer's acquaintance with Dr. Byford, which soon ripened into quite intimate friendship, began more than a quarter of a century ago, when, just entering the profession, his advice was solicited concerning matters purely personal. We were often travelling companions in the early days of this Society, and for a few years we were neighbors and met almost daily. He was a genial companion, modest in demeanor, with a fund of anecdote pleasureable and instructive and never of an objectionable character. His manner was impressive, commanding respect as became one who was in every regard a typical Christian gentleman.

He possessed in an eminent degree that quality which is often termed personal magnetism, a quality which could not be better manifested than by the quickness and pleasure with which children always responded to his ever friendly notice.

Our mutual friend, Dr. H. P. Merriman, of Chicago, has paid the following tribute to him, than which none could be higher: "I found in him that education which all colleges aim to give, but which they so frequently fail to confer, namely, *mental* and *moral* power, which he could use in the every-day work of life. Not only do his books and his lectures show the strength of his mental power, but when any of us took him a knotty problem or a difficult case, we were surprised at the light he threw upon it, and the readiness with which he cleared up its intricacies. I found in him a *moral* power that was a constant delight. He could be depended upon in emergencies requiring strength of character as well as of intellect. There was a largeness in his spiritual calibre that made him above petty jealousies. His heart rejoiced in the success of others, and it always gladdened him to help them."

Upon women who are endeavoring to do something in the world, whether from ambition or necessity, or a desire to be useful to their kind, no greater boon can be conferred than

the ways and means to help themselves. The earnestness with which Dr. Byford labored for the furtherance of the medical education of women and the training of them for nurses showed not only that he appreciated this truth, but that he possessed a truly philanthropic spirit.

A glance at Dr. Byford's life beyond the professional portion reveals another side of a fine nature. His tastes were of a domestic character. In his own home, surrounded by those he loved and who in turn were devoted to him, he found his chief pleasure.

Dr. Byford was twice married. In 1840 to Mary Anne Holland, a daughter of Dr. Hezekiah Holland, by whom he had four children. She died in 1864. In 1873 he married Miss Lina Flersheim, who had one child, which died in infancy. His eldest son, who was engaged in the practice of medicine in Minneapolis, died several years ago. One of the distinguished Fellows of this Society, Dr. Henry T. Byford, is the sole surviving son.

Dr. Byford's family are well provided for, as the result of an unusually lucrative practice and judicious investments.

Dr. Byford's death was not preceded by any painful or protracted illness, although he had been cognizant for about three years that he was liable at any moment to be overtaken by the great Destroyer.

At the age of seventy-three, with his mental faculties unimpaired, he continued his daily routine of professional work almost to the end of his earthly career. He retired as usual on the night of the 20th of last May, and in the early morning of the next day succumbed to an attack of angina pectoris.

His death was an ideal one for such a man, honored and beloved as he was. With a long life well spent, after a full day's labor he drops the burden of life "like one who wraps the drapery of his couch about him and lies down to pleasant dreams."

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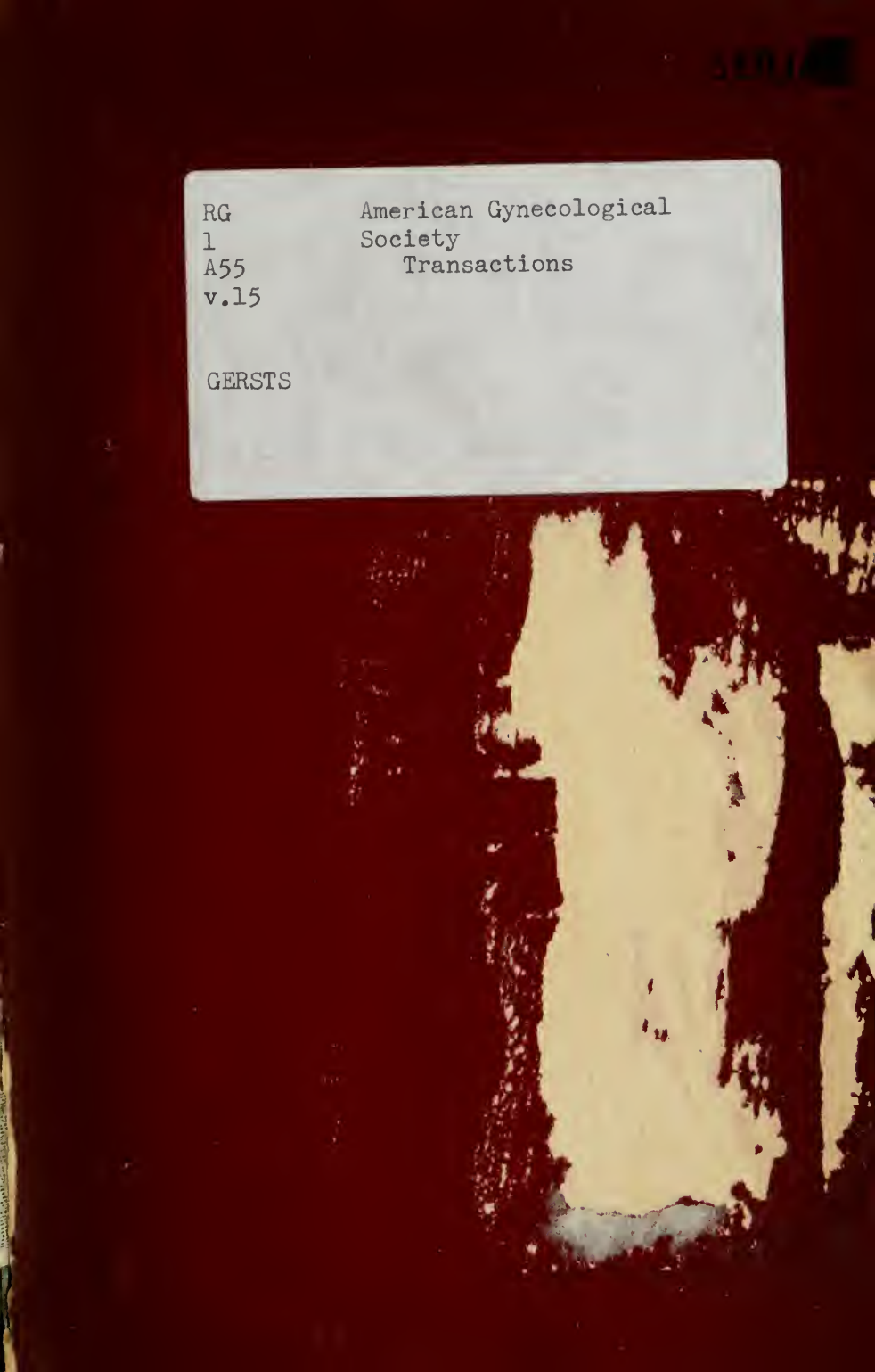
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